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BRIEFLY TOLD.

DEATH OF MR. CHARLES VAN SICKLE.—With much regret we are obliged to record the death, at the home of his son, in Fort Smith, Ark., the evening of the 17th ult., of Mr. Charles Van Sickle. Deceased, who was Manager of the Arkansas Territorial Oil and Gas Company, one of the properties controlled by Messrs. H. M. Byllesby & Co., was born in Flint, Mich., September 7, 1852, and early removed to Kalamazoo, Mich., where his education was gained and where he learned the art of the millwright. From 1874 to July 15, 1898, he was thus engaged: With the large sawmills located in Muskegon and Manistee and the John Spry Lumber Co., of Chicago. With the latter concern he started at the bottom of the ladder, and on his leaving it had entire charge of the mechanical department thereof. In 1898 he became interested in oil developing and in time no other man was better known in the producing fields of Ohio and Indiana. October 1st of that year he organized the Federal Oil Company, with headquarters in Chicago, occupying the offices of Vice-President and General Manager. The Company subsequently went under the domination of the Standard Oil Corporation. In June, 1906, he went to Fort Smith, and later on became identified with the Byllesby Company's interests. This firm were the controllers of all the public utilities of that city, and Mr. Van Sickle took prominent part in the development of the Arkansas and Territorial Oil and Gas Company, in which capacity death found him. He was a most valued member of its staff, his knowledge of natural gas and oil conditions being little short of wonderful. The offices of the Company in Fort Smith were closed the day (the 21st ult.) of the funeral services, which were attended by the staff and scores of the residents of the city in which he had become a great social favorite. He is survived by a son (Walter S.), who is Assistant Manager of the Arkansas and Territorial Oil and Gas Company. For the main facts in this story we are indebted to Mr. W. H. Hodge, of the Byllesby Company.

THE GAS RATE AGITATION IN CHICAGO.—Some months ago the authorities of Chicago, consonant with the practice, which has prevailed in that city for 2 or 3 periods of 5 years, of adjusting the gas rate from time to time, wishing to arrive at a rate for the ensuing 5 years, that would be fair to user and producer, began the adjusting proceedings in a manner that was eminently fair. The initiative in the matter was taken by the Gas, Oil and Electric Light Committee, of Council, and this section of the Board relegated the inquiry to a sub-committee, composed of Aldermen Pringle, Long and Merriam. These gentlemen, to their exceeding credit be it said, proceeding along sensible lines, employed Professor W. J. Hagenah—a man who, although relatively unknown to the industry at large as an expert in gas manufacture and distribution, nevertheless was well equipped for the task. After lengthy investigation, much patient research and protracted analyzing (and in all phases of the case he was given free, untrammeled access to the records and accounts of the Peoples Gas Light and Coke Company by its officials), the whole covering a period of months, he handed in his report and deductions. The document, both in arrangement and tone, proved an admirable one in the main, although in at least two respects the findings thereof look unduly harsh towards the Company, the most notable of which, as it seems to us, have to do with "rentals" and "depreciation" schedules. However, in the main, the findings are eminently fair. The existing rate for gas in Chicago is 95 cents, gross; 85 cents, net, per 1,000, and Professor Hagenah recommended that a fair rate for the next 5 years would be, respectively, 87 cents and 77 cents—this allowed for a return of 7 per cent. per annum to the shareholders, which allowance permitted on the basis of estimating on the present output, a surplus for the first twelvemonth of $141,753—pretty narrow basing on a gross business closely approaching a revenue of 14½ millions of dollars. When the sub-committee turned into the main Committee the results of its labors, which in turn submitted the same to the full Board. What was the result? The usual howl from the average Alderman greeted it, and the turmoil to upset the findings of Prof. Hagenah, was as the yelping of the pack that had just struck the scent. To add to it all an election for

Mayor came on, and one of the aspirants to that position (which "place" he more or less filled at other times) raised as his election slogan, "Down with the Hagenah recommendations and up with 70-cent gas, no matter who suffers!" Unfortunately he was elected, and the case as it stands is, shall the commonsense acts heretofore done in connection with the rate readjustment stand; or shall the demagogery, political expediency and the humbug of charlatanism in civic affairs determine a point that vitally concerns one of Chicago's greatest industries—an industry by the way, whose cash contribution to the taxing lists of Chicago yielded to the city treasury a sum well in excess of $600,000 last year?

ILLUMINATING ENGINEERING SOCIETY (APRIL MEETING), PHILADELPHIA SECTION.—The regular April meeting of the Philadelphia Section, Illuminating Engineering Society, was held on Friday, the 21st ult. The usual dinner, which preceded the meeting, was served in Green's Hotel, and was shared in by about 15 members and guests. The meeting, which was presided over by Chairman Wm. J. Serrill, was called to order at 8 o'clock, in the assembly room of the Philadelphia Electric Company's building, 1000 Chestnut street. The speaker of the evening was Mr. E. C. Crittenden, of the Bureau of Standards, Washington, D. C., whose subject was "An Experimental Study of Flame Standards." The author stated that a great deal of work had been done with flame standards, and that most of the results had been reported at the lecture course, recently held in Baltimore, under the auspices of the Illuminating Engineering Society. He also stated that the sperm candle was not now made according to specifications, and the manufacturers of these candles do not claim that they are standard. Sample candles, taken from different lots, showed a variance in candle power of as much as 2 per cent., so that the candle could not be considered a reliable standard. The Elliot kerosene lamp gave unsatisfactory color values depending upon the oil used, and the candle power varied under changing conditions. It required an expert to keep the wick trimmed correctly. The Hefner lamp was not reliable for the following reasons: First, the candle power was so low that a slight variation in it meant a high percentage change. Second, this lamp had to be kept in practically an air tight room, as it was easily affected by draughts. Third, the amyl-acetate was found to contain impurities, which also affected the candle power. The pentane lamp was found to be the most reliable of the flame standards. Mr. Crittenden showed a drawing of the Harcourt and the American pentane lamps, with results obtained from both type of lamps. A large number of readings made on each type showed the English lamp to more nearly approach 10-candle power, the reason for which being probably due to the fact that the plate for dissipating the heat from descending tube was brazed to the tube in the English lamp, while in the American type the plate is fastened with screws. A number of experiments at the Bureau of Standards showed that a change of 10 per cent. may be obtained, depending whether the heat dissipating plate was loose or fastened in position. In the English lamp the hot ascending tube is connected to the cool descending tube with a heat insulating material, while this connection in the American lamp is metal, thus conducting heat from the hot ascendiug column of air to the cool descending column. The author also stated that the wooden gauge, used to flare the inner chimney at 47 millimeters, had been found to shrink, so that a metal gauge was now used. In the English lamp the inner tube was held by set screws near the top of the tube, and the tube expanded, which also decreased the height of the inner tube above the burner. Mr. Crittenden showed a drawing of a pentane lamp designed by the Bureau of Standards. In this design the holder for the pentane was below the flame, the pentane being vaporized by means of an electric heater. The equipments at the Bureau have shown that the factor for variation in candle power of pentane lamp, due to water vapor, is 0.0567. This factor is that for 1 part of water vapor in 1,000 parts of air. The discussion following the paper was participated in by Messrs. W. J. Serrill, G. S. Barrows, C. O. Bond and P. Kelley. The questions and answers were as follows: "In a small gas plant in the country should the sperm candle be dispensed with and the pentane lamp used?" If candle power was only for information of the gas company the sperm candle was probably accurate enough. If the gas company were under restrictions to furnish a certain candle power gas, this would warrant the cost of the pentane lamp. "Does the pentane lamp have to be calibrated frequently?" This lamp will require no calibration for a number of years. "Does the knocking-off of the paint from the inner tube of the lamp affect the candle power of the lamp, due to the difference in the temperature of the heated air?" The air is heated by conduction, not radiation; so the air is heated to same temperature whether tube is painted or not. "Why should not the inner tube be made of glass?" This was found unnecessary, as shown by the answer to the question just asked.

ILLUMINATING ENGINEERING SOCIETY (CHICAGO SECTION), APRIL MEETING.—The April meeting of the Chicago Section, Illuminating Engineering Society, was held in the Green Room of the Kuntz-Remmler Restaurant, No. 442 South Wabash avenue, Thursday noon, April 20th, at which there was a large attendance. After luncheon had been served, Chairman Pearson made a few timely remarks, and then introduced Mr. C. R. Gillman, of Milwaukee, Chief Electrician of the Chicago, Milwaukee & St. Paul Railway Company, who read a very interesting paper on "Recent Developments in Train and Car Lighting." His paper was copiously illustrated and gave many concrete examples and tests showing what a marked improvement in train lighting had been brought about where an illuminating engineer was employed. The greatest improvement was in the use of shades over bare units and the intelligent use of efficient reflectors, whereby they received an average of 4 foot-candle distribution on a horizontal plane 33 inches above the floor, under the old method, from 32 16-candle power lamps, they now receive an average distribution of 2-foot candles from 16 8-candle lamps by the use of reflectors. By reducing the distribution of light from 4 to 2 foot-candles, they found that it reduced eye fatigue on the part of the travelling public as well as bringing out the beauty of the fine woods and decorations in the cars. Mr. Gillman said that, while a considerable number of installations had been made of electric lighting in trains, Pintsch gas was used as much as ever, and that the equipment of the lighting units with inverted mantles had largely increased its value.

APRIL MEETING, SYRACUSE SECTION, NATIONAL COMMERCIAL GAS ASSOCIATION.—The regular monthly meeting held, April 18th, was one of the most enjoyable held by the Syracuse Section, N. C. G. A. The Meeting Committee had arranged a special programme, which came as a total surprise to all, producing the "Witch Scene" from "Macbeth," and which was a demonstration of "Roasting in a mild form" of the different officers and employees of the Company. A paper, read by Mr. J. E. King, on "Distribution Electric," evoked some very valuable points in the ensuing discussion. Refreshments were served and the orchestra rendered a very appropriate musical programme. The attendance was 162.—B. H. A.

PUBLICITY.—There are three large publicity undertakings which should be of interest to those connected with the management of gas companies. Two of them are new, and one was always with us. The oldest of the three is the hearty co-operation among large electrical manufacturing interests and their associations. The second is the campaign which is to be made for the popularizing of electrical vehicles, the expenses of which will amount to fully a-quarter million of dollars. The third large undertaking is to be carried on in England, but comes nearer home for the gas men than the other two. During January of the present year a Committee, organized by the Council of the Institute of Gas Engineers, and the commercial sections of various gas associations, issued a circular inviting subscriptions to a "Publicity and Special Purposes'" fund. This has been followed by a recent conference at which some 250 were present, the results of which conference, as reported by the *Gas World*, are as follows:

"That the scheme proposed by the Publicity and Special Purposes Committee of the Institution of Gas Engineers, and set forth in the statement issued on 2d January last, and further explained in the memorandum read to-day, is approved, with reservation as to the amount of the subscription; and that the Committee be requested to take all necessary steps to bring this resolution to the notice of gas undertakings, especially drawing attention to the fact that the subscribing undertakings will be represented on the committee administering the funds."

In such form it was unanimously carried. It was understood that the Provisional Committee will reconsider the matter of the amount of subscription, and that an announcement will be made later. As the funds required for this publicity undertaking are to be obtained by subscription, attention is at once drawn to the fact that a similar condition exists in this country. While a nominal fee, and an association open to all alike, may become a factor numerically, one may not hope to have the power or the financial standing to project and carry out a comprehensive publicity campaign, should one be desired, with as little friction as is possible in the case of the National Electric Light Association, where the large companies provide the sinews of war through company membership, the younger men contributing towards the enthusiasm through individual membership.

CURRENT MENTION—

MR. JOHN W. HACKER, of Kalamazoo, Mich., has been named to take the next gas course in connection with the fellowship thereon maintained by the Michigan Gas Association in the Michigan University, Ann Arbor.

THE Board of Control, Wheeling, W. Va., will, on the 9th inst., open bids for the proposed changes on the local gas works, as prepared by Mr. W. A. Baehr.

MR. CHAS. F. LEONARD, formerly Works' Superintendent of the Fall River (Mass.) Gas Company, has been appointed by Governor Dix Chief Gas Inspector for the State of New York. The examination was competitive, and 150 contested. No better man could have the place.

BOOK REVIEWS.

"*Distribution by Steel.*"—A short and fully illustrated reference book, covering the use of steel mains and service, English practice, by Henry Woodall and B. R. Parkinson; 140 pages; 76 illustrations; 5¼ by 8¼ inches. John Allan & Co., London. For sale by the AMERICAN GAS LIGHT JOURNAL. Price $2.50.

The authors have taken considerable pains to describe in detail the practical application of steel tubing for gas mains and services. Both the material and the accessories are covered, and a reason for the further use of steel is given by the authors in their preface: "The time is at hand when gas engineers will be thinking in pressures of pounds per square inch, and that distributing mains will be laid accordingly."

The Hamburgh Gasholder Disaster.

[Prepared for the JOURNAL by MR. NORTON H. HUMPHRYS.]

Although this disaster occurred as long ago as the 6th December, 1909, the circumstances need not be recapitulated. The appalling loss of life and limb, about 20 deaths, and double that number of severe hospital cases, the destruction of property involving enormous money loss, which would not be covered by £500,000, are events that will not readily be forgotten. The keen interest of all who are concerned not only in the construction, but in the working control of gasholders is naturally directed towards the contributory causes to such a disaster. A most searching and complete inquiry conducted under the highest authorities available, is known to have been in progress, and that such investigations did not err on the side of undue hurry is evident from the fact that they have been extended over more than a twelvemonth. They have now been published, and an attentive perusal shows that they are worth waiting for. They give, in as plain a manner as one can conceive to be possible, the causes of the failure, and I do not propose to summarize or repeat the conclusions arrived at. It would be impossible to improve or to render them more understandable, and, therefore, it is suggested that the following remarks should be read in conjunction with the published extracts from the official reports, and in no sense as a substitute for them.

The disaster has occasioned much needless alarm to the numerous residents who live under the shadow of large gasholders in our principal cities. One can well understand that parties who at the date of the occurence were resident in the neighborhood of the Grasbrook gas works, will have a strong objection to such company in future, but the same objection will apply to a greater or less extent in all parts of the world. The question that this large class of people anxiously ask is: Are all gasholders equally liable to a like disaster? To the man in the street one gasholder is the same as another, and it is very difficult to make clear to him the fact that the Grasbrook gasholder tank was of a new and almost unique design, only two or three of that pattern, and none approaching a similar size, being in existence. For the relief of any person who by force of circumstances finds a large gasholder too near to be pleasant, it should be made clear that the causes of the disaster are peculiar to that special form of structure, and that there is no risk whatever of a repetition, in the case of gasholders of the usual type.

The occurrence was not an "accident" in the sense in which that word is ordinarily understood. By the word "accident" we indicate some special, immediate, contributory cause, or combination of causes, of a character that cannot be foreseen or guarded against. It is the risk of such "accidents" that constitutes the dangers incidental to ordinary civilized life. Such an unexpected and unpreventable circumstance as the flame of the escaping gas firing the roof of an adjoining gasholder house was an "accident," so far as the second gasholder is concerned; but the searching inquiry has falled to elicit any evidence worth serious consideration as to any contributory cause of this description, either in the construction or working of the holder. There were the usual slight deviations from the strict letter of the specification, which are unavoidable in a structure of this magnitude. But, generally speaking, the work was carried out in the manner usual to a first-class firm. There was no negligence, either ignorant or intentional, and the dimensions of the various parts were all according to Cocker.

The tank was annular and carried on a base or structure of a height sufficient to admit of windows and doors communicating with the interior. The base consisted of radially placed piers or buttresses, joined by arches supporting a level platform, some 22 feet wide and 240 feet in outside diameter. The exterior wall of the annular tank was of wrought iron and the interior one of concrete. There was a large central pier some 30 feet diameter, and the floor of the tank, which also formed the roof of the inclosed chamber, was raised to a height only a few inches below the tank overflow level, so that a very thin layer of water would rest upon it at any time. The weight of such water, and that due to the structure of the holder, or so much of it as was off the bottom bearings, would, in theory, be equally dif fused over the area of the roof. This roof or floor was flat, made of wrought iron, carried upon radial girders extending from the top of the inner wall of the annular tank to the central pillar, and further strengthened by struts or props extending from the base of the annular tank to the top of the central pillar. This explanation is necessary in order to render intelligible the official explanation, which is to the effect that the designer, in fixing the dimensions of the struts and girders, sailed too close to the wind. The struts were barely equal to the normal strain to which they might be expected to be subjected in the course of ordinary working. Two or three of the struts buckled, the roof sank and split, and the contents of the holder escaped into the covered chamber and were fired, it is suggested by sparks, caused by the wrenching and violent scraping of the falling parts.

The occurrence reminds us that science has its dangers as well as ignorance. We were often told in our youthful days that a little knowledge is a dangerous thing, but one does not secure immunity from danger in the company of the brightest and best of our race. Disaster is not confined to the fool who revives the failing fire with the help of a large can of petroleum, or sits down on a barrel of gun powder to enjoy a quiet smoke. Instances can be given of leading chemists and engineers who had also come to grief. There is something in the way of the luck of Edenhall in the modern specification. Skill and mathematical formulæ are directed towards ascertaining the slightest and cheapest structure that may he erected to serve a given purpose. And the specification, in the present example, shows strong evidence of every possible cutting in cost, so as to bring what is intrinsically a costly design within the limits of comparison with structures on the ordinary plan. One can understand that a less educated designer would, as a matter of ordinary precaution, favor a larger factor of safety.

After the most careful calculation, it is always usual to add a quantity known as the factor of safety. If an engineer is designing a girder to carry 10 tons, he does not think of calculating out the bare section of metal equal to the support of that weight, but takes a factor of safety varying from 2 to 5 according to circumstances, and puts up a girder equal to 20 or even up to 50 tons. And this factor of safety is by no means imaginary, but has to meet many varieties of contingencies that are uncertain but none the less real. There is the risk of defect or weakness in the material used, and in the manner of joining up, and the risk of such defects will increase with the number of members. It will be greater in a large complicated structure, comprising hundreds of separate pieces or members, than in a small affair built up of less than 10. The same argument applies to an individual member that is exposed to stress, whether compression or tension does not matter. It may vary from one plain bar or post up to any number of parts, and in dimensions such that its own weight is of no consequence, or a very large item, as regards the total stress. A feature in connection with a number of joins, apart from the strength of the joint itself, is the possibility of developing a new set of strains in the act of screwing up or rivetting. In a number under tension, any strain put upon it by screwing up at one or both ends, will go to weaken the working strength or resistance to stress. Then there are the working errors in setting out the measurements. With utmost care and refinement, and granting that the dimensions are as correct as experienced skilled constructors can make them, there is only a close approximation to absolute mathe matical accuracy, and not the real thing. In the case of composite members comprising two or more parts, in theory the stress is equally divided. Two parts, take half each, three one third, and so on. But a slight difference in setting order in joining up may have the effect of dividing the strain unequally. The same holds good in the case of a completed structure. A roof or floor may consist of 20 members, and, according to theory, each member takes $\frac{1}{20}$ of the stress on the whole structure. But in practice it is probable that the load is not so equally divided, and under certain conditions stress is applied unequally.

Even before the structure has left the contractor's control, it is possible that in some parts the members are submitted to stresses very different from those indicated by calculation, and the liability to unknown variation extends to the working condition. With regard to a gasholder and tank it is a very simple matter of statics to reduce the floating load to terms of the bulk of water displaced, and in the case of a holde r comprising several lifts, to take out the strain for each lift, and to assume, if the base of the tank is supported by x members, that the strain or stress on each is $\frac{1}{x}$ part of the whole. If there is a large overflow, sufficient to allow the displaced water to run off as fast as each lift rises off its bearings, the variation in stress at different positions of the holder may be very slight, because the weight of each lift is counterbalanced by the displacement of a corresponding weight of water from the interior of the vessel. In the case of a tank with no overflow below the level of the water, outside, when the holder is full, the weight of each lift as it rises comes upon

the base and sides of the tank. The inside level alters very little, but the outside level rises. But at first sight it appears that the difference is trifling, perhaps equivalent to 2 or 3 inches of water for each lift. Taking each lift of the Hamburgh holder as equivalent to 3 inches of water, the total of the four lifts would be 900 tons.

Common sense would indicate that the tank should be fully equal to the second condition, and that any effect of the overflow in reducing the strains should not be taken into account in connection with their design, because the overflow is liable to be blocked by frost or floating bodies, and the holder may be loaded by snow. And as regards the strans on an ordinary full depth tank as compared with one on the Intze pattern, there are two important differences. One has a solidly sustained base, while the other is supported perhaps only at the circumference and the center, at any rate at a few points only. The full depth tank will be designed to contain perhaps 50 feet depth of water over the whole area, while the flat roof of the Intze design, which represents nearly the whole of the interior area, may have less than 1 foot. Compare the maximum variation as a ratio of the maximum load, in both cases. In the first it is 2 per cent., in the second 100. A tank is not likely to be affected by variations well inside of 2 per cent. on the total stress, but changes ranging up to 100 per cent. may have an important result as regards finding out the weak places. The usual practice is to fill the tank to overflow, and to assume that if it stands sound, it will be equally satisfactory when the holder is full. A tank that is equal to holding 50 feet depth of water is not likely to fail under 51 feet, especially considering that the base and probably some portion of the sides are solidly supported; but with a hollow or girder supported base the conditions are very different.

The simple statical calculation assumes that each lift is always mathematically true and level, and diffuses its weight equally over all parts of the area covered by it. But a decided list to one or other of the lifts, or the action of wind bearing upon say one-fourth of the circumference, will disturb this comfortable order of things. There is nothing of a jerky or percussive character about the ingress and egress of gas or water, but a grip and let-go action is not beyond the bounds of possibility. The rise or fall due to intake or to output of gas is never likely to exceed 1 inch per minute, and there is nothing sudden about that. But a cup may be bound or held by snow or by a foreign body accidentally falling into it—stones, bricks, pieces of iron, etc., accidentally or perhaps maliciously introduced, are not uncommon. In the case of such binding the pressure rises until sufficient force has accumulated to crush or displace the obstacle. Immediately that point is reached there is a go-free action that may result in the structure jumping or springing an inch or two above normal, and its return by an ordinary fall due to its own weight. This sudden return may cause a momentary increase of strain that is a very trifling percentage of the whole in the case of the full depth tank, but a very important proportion in the hollow supported tank, to which a variation equivalent to 2 inches of water may mean over 10 per cent. of the total. The Intze pattern, under ordinary working contingencies and conditions, will be called upon to meet a wide variation of stress, and it is reasonable to suppose that such variation, as regards individual members of the structure, will increase with the size of the structure, or at any rate with the distance between the points of support.

The small number of hollow tank gasholders that have been built is perhaps scarcely sufficient to warrant general conclusions, but the lesson of the Hamburgh disaster stands out very plainly. The Intze pattern tank brings with it a class of risk that does not apply to the solidly supported tank. And to meet that risk a high factor of safety is called for. That being the case, is the game worth the candle? Would not the better plan be, instead of erecting a large holder on valuable land in populous districts, and endeavoring to utilize the site for other purposes at the same time, to move out into the outskirts of the district where land is cheap, and there erect a safer and less costly structure.

MR. HERBERT BREEN, since 1895 in the service of the Chuctanunda Gas Company, of Amsterdam, N. Y., has resigned therefrom, in order to go into a business partnership with his father, Mr. John Breen. As a token of their friendship for him, the employees of the Company, on hearing of his proposed act, presented him with a handsome fob piece, which will render his identification with the order of the Knights of Pythias a very simple matter.

Some Recent Developments in Gas Retort Bench and Chamber Oven Construction.—No. II.

[Prepared for the JOURNAL, by "DESIGNER."]

In compliance with the scope of this paper, let us first consider some of the most recent types of horizontal retort benches. Throughout this description a standard (or nearly so) size retort is spoken of; one not less than 16 inches by 22 inches, or larger than 16 inches by 26 inches in cross-section, adapted to the width of skeleton arch. The D-shape is mostly in favor, yet in Germany and England some oval profiles are manufactured. The former is preferable and can be improved upon by a slight widening at the lower inside corners, instead of having straight sides. Sectional retorts have been made in this country, sections running from center to center of piers and a headpiece. From all indications they have held up; but, be it borne in mind, that a non-shrinkable fireclay material, such as pure silica, can only be used for their manufacture.

The bench with 8 or 10 horizontal retorts, set in two vertical rows, has found much favor among engineers of some of the largest gas plants in the United States and England. The retorts are either 15, 16 or 20 feet long, with open ends, usually termed "throughs." The skeleton arch is built as narrow as practical, to save in ground space and make the production per square foot of bench area as large as possible. The main arch consists of 12-inch by 12-inch tiles, and this arch is usuallly superimposed by a relief arch of tiles, 6 inch by 6-inch, or two courses of firebrick with joints staggered. This relief arch should be struck from a center higher than that of the main arch by about 4 inches and using a smaller radius, so that it will carry the load above it with the greater forces distributed on the sides instead of the center. The pier walls are 18 inches thick above floor line anh 22½ inches thick below; however, in some cases, the 18-inch wall has been carried down throughout the entire pier. The thicker wall below the floor line has a distinct advantage, as it allows for a recess of the lower setting block, which in turn relieves the recuperator of the weight of the setting. Front-and-back walls above floor line are 13½ inches thick, as also the walls in front of recuperators. Furnace walls are suited to the type of producer, and range from 13½ inches to 27 inches thick at the top.

The retorts in a bench of 8's are placed, as above stated, in two vertical rows, and the two uppermost on each side are on separate center lines, while the two lower ones are placed on the same center line. This plan may be changed to having all 4 retorts on same center, which is necessary when stoking machinery is used operating several retorts simultaneously. The arrangement of standpipes is varied, and in most instances each mouthpiece has its own standpipe. The diameter of the pipes is 8 inches inside. When two or more retorts are connected together, as is generally the case if one side (or 4 retorts) is placed on same center line, the inside diameter of the standpipes is then made 10 inches. In a bench of 10's the disposition is very similar, except that the 3 lower retorts of each side are situated on the same center. Usually two of them are joined, as it is an impossibility to work independent standpipes for the 10 retorts in an arch of conservative width.

Recent practice has been to divide a setting with 20 foot retorts into two compartments, a half-front (charging side) and a half-rear (discharging side). This division is attained by either a firebrick or a fireclay block wall and runs within an inch or two of the inside crown of the main arch. Under the stage floor level this will widen to form the curtain wall, providing one is used in the producer. The curtain wall separates the furnace in such manner that part of the gases is held in the front while another part is conveyed to the rear of the settings; besides, the fuel has a "backing" and better results are obtained, from the fact that it lies in such condition as to insure a uniform flow of producer gases. Much discussion has arisen over the use of water plates in the furnace. The German engineers use a long row on an incline at least 36 inches high. They also advocate the use of water vapor in medium quantity. The steam is derived from a developer located on opposite side of clinkering door, and situated in a specially designed chamber above the waste gas outlet flue. The developer is fitted with two take-off pipes which lead to the sides of the recuperator where the steam and primary air mix and this mixture is led into distributors located close to the ashpan sides. Here the quantities of water vapor and primary air are kept under constant control.

The recuperators, be they of horizontal or vertical flue type, must conform with the details of the entire bench. A tedious travel of the

waste gases and secondary air is to be avoided and, therefore, better results are obtained with the vertical flue type in which the gases go down in staggered fashion, the air travelling in the opposite direction. The quantity and speed are regulated by proper dampers and slides. Let us not forget that modern benches of this type are provided with tiles covering the top of recuperator, the top of the secondary air outlet flue and the waste gas outlet flue, these tiles having openings in their center upon which can be placed the small 9-inch by 9-inch slides. This method of design permits the adjustment of the heats in the setting at all points; the recuperator is likewise under control and the secondary air can be thrown to any producer nostril in the combustion chamber by moving these slides over the openings in tiles to the desired place.

The main waste gas flue is located in the lower middle of the bench and its size is determined by the number of benches it has to serve. Generally it is arched on the top by two courses of tile or firebrick. When using the steam developer the waste gas flue is led to the rear of bench and built under the grade level with openings provided for access. Besides having the dampers in the lowest part of the recuperator each stub connecting to the main flue should have a damper and the chimney stack be also fitted with a large damper at its bottom inlet.

Passing to the bench with 12 horizontal retorts in a setting, the 20-foot throughs are only to be studied in this paper. Many features are similar to those embodied in the benches with 8 or 10 retorts. It is necessary to state that in some parts of the setting and walls construction calls for heavier or stronger design. The retorts are arranged in 3 tiers of 4 on each center line. Separate standpipes cannot be used for lack of room; however, it has been achieved by taking the gas from 6 retorts on the charging side and 6 on the discharging side. This arrangement necessitates the installation of 2 hydraulic mains.

Most engineers have adopted the method of fixing the standpipes on the charging side, as when the gas is taken off on the discharge end the coke is liable to be deteriorated by tarry matter on the mouthpieces. In benches of twelves the recent custom has been to connect 2 retorts into one standpipe, making 6 pipes for the entire setting. Let it not be forgotton that much trouble was encountered with mouthpieces on benches of twelves as well as eights and tens; they break off, not being able to sustain the load of the heavy pipes, until proper bracing was placed under each row horizontally in the form of an 8-inch channel iron or I-beam. This bracing is likewise attached to discharge side of the bench, but here it serves to both support as well as keep the retorts in line from being pushed out by the stoking machinery.

The setting in the twelves is divided in two compartments same as the eights or tens, and when inside generators are used the curtain wall is also provided in this type of bench. In all cases let it be understood that only one generator or producer is to be considered for one bench. Four years ago a patent was granted to one of the foremost bench builders in this country on a bench of twelves, having two inside generators located side-by-side, at one end of the bench; the generators occupied the discharge end whilst the recuperators the charging end, and both were entirely independent, except for a communicative flue at the top directly below the apex of the arches. Here the openings ran through the division wall and, fixed at different places throughout the length of the generators (in this instance six openings) were provided. Outside producers have been applied at the Provan gas works, Glasgow, Scotland, one serving several benches of twelves. Toronto, Canada, has something of a similar construction, but both cases are benches with stop-end retorts, 9 feet long and built back to-back.

Before going into the vertical retort bench and chamber oven design there are two types of benches recently built which deserve mention. The first is the bench, with 3 feet deep retorts, designed by Mr. Glover for the Norwich gas works, England. Six retorts, each 36 inches high by 12 inches wide and 21 foot long, are located in one setting. They are made of specially shaped, tongued-and grooved bricks, breaking joints on the supporting walls. The sides exposed to the highest temperature are protected with silica shields. The top and bottom pieces are formed of rebated tiles, 4 inches thick, and turned on the corners to catch the side tiles. Each retort has its own standpipe. The mouthpieces are suited to the size of the retort and fitted with self-sealing lids. Mouthpieces are supported in front and rear by I-beams. The setting at Norwich is made entirely of brick, while the generator and recuperator of the Kloenne pattern are made of special tiles. Both of these do not differ from the standard construction used in benches of tens.

Another bench of a very similar type was designed and built by Edward Riepe & Co., Gliesmarode, Germany. Here 10 large retorts are situated in two horizontal rows in the setting. Each retort is 9½ inches wide by 33 inches high by 20 feet long, and each is provided with separate standpipe. The setting is built of special tile, so are the generator and recuperator. The latter it can be said differ from the general type since the plan has double rows of flues, the secondary air being located between the waste gases. The inventor lays claim to one distinct advantage derived by the narrow dimension of the retorts, in that he can penetrate the charge of coal in less time at smaller fuel expense than in the Norwich benches. In both benches the retorts are filled completely to overcome all danger of exposing the gas to overheated surfaces, thereby preventing the disassociation of the higher illuminants or valuable hydrocarbons.

The Dessau vertical retort bench, patented by Dr. Bueb, has worked its way into many gas plants of Germany, England, France, Belgium and Holland. One installation is in operation at Providence, R. I. The construction of the most recent type may be described as follows: The bench is divided into three parts: The generator, setting and recuperator. The generator approaches a square cross-section and runs from the grade level to the top of retorts. It is charged from the top and has double clinkering doors in front wall. To each side of generator are the recuperators, built of special tiles, extending also from the floor to retort level. In the "Model, 1910," the setting consists of 18 retorts arranged in 3 rows of 6 each on one center line. Three retorts are connected together to form one gas off-take. Special care is taken in the design of the setting to get the proper taper of retorts and the surrounding tiles. The producer gases enter from 2 nostrils into a distributing flue, where each connection into the retort setting can be adjusted with fireclay slides. The secondary air is introduced in two small streams along each side of the first row of retorts.

The retorts are made 13 feet long, tapering in size from about 7½ inches by 11½ inches, at the top, to 14½ inches by 21 inches at the bottom, all inside measurements. The 3 rows are placed in such manner that 6 retorts face the generator. Three separate sections make up one retort and each has several collars. One of these serves as a socket for the next upper section and also provides support for the setting tiles. The gases are run in zigzag fashion in the retort setting, and the baffles are 2½-inch tiles, of which 3 tiers are usually built. Entrances have been placed in the lowest and the second top flue for admission of secondary air. Care is taken by the constructors to make all parts of the bench scientifically and practically correct. One feature of the generator that stands out prominently is its shape with size. The producer gas outlets, which are situated in about the middle, have the advantage of a steady supply of carbon monoxide at the minimum depth of fire; almost all fuel above this point is storage. Primary air and mixing flues are located in the back wall of furnace. The steam developer lies below the ashpan, and the vapor is led into one flue where the waste gases are surrounding it, from whence it passes into a flue above where it meets with the primary air and the mixture is then conducted under the grate bars. The recuperator of the vertical flue type is made accessible at every point for cleaning and observation of heats, as also is the setting fitted with holes and stoppers in every tier. A waste gas flue of same design as that used for through benches, is placed under the grade level.

The Bolz vartical retort bench differs in some respects from the Dessau, in that it has the generator furnace below the retort level, and the recuperator is built between the retorts above the stage level. Of the retorts there are 20, divided into 2 compartments of 10 retorts each. The size of the retorts is nearly identical with the Dessau system. The baffling and zigzag flow of the gases is also the same, except that the gases are supplied against the narrow sides of the retorts from two opposite directed distributing flues.

The radical difference in construction lies in providing an auxiliary producer to manufacture water gas, which machine is situated close to the generator on same level. The location of both these apparatuses below the retorts enables the hot coke to be dischared into them by means of specially designed movable chutes. Between the producer and generator lies a coke conveyor, and whatever coke is not desired for fuel is dropped into it by displacing a slide and closing the chute opening for the generator and producer. The generator is large and has a step grate, its top being arched over with 3 courses of firebrick. The back of furnace is deeply inclined so as to form a pocket for the ashes and no pan is used. The generator gases rise on both sides in masonry conduits to distribution passages arranged on the two opposite sides of the furnace near the retort chamber. Above

these passages is built, throughout the whole breadth of the retort chamber, the recuperator with its passages for preheating the secondary air.

The Bolz system saves considerable ground space, but in a bench of 20 retorts the bulk of material is very great. The inventor has, by means of special bracing, overcome undue distortion of the structure. The bracing of the furnace, which consists of channel iron and tie rods, is made independent from the bracing of the retort chamber, which rests on 5 double rows of 12-inch I-beams, placed longitudinally, and 4 single rows of I-beams, running on top of the vertical generator gas conduits. The retort chamber, which has the highest temperature is, therefore, held together by separate bracing, and can expand freely on all sides without in any way impairing the stability and gas tightness of the structure.

Instead of having one large chimney Bolz provides separate small stacks for each set of waste gas flues, and claims the advantage of operating with considerably less draught than the Dessau benches, and neither dust nor ash is blown into the furnace chambers. It must be mentioned that of the lower section, about 10 feet of the chimney stack is constructed of a double steel shell. A 7-inch space is permitted between them so as to form a steam developer for the supply of vapor to the generators.

Coming to the continuous vertical retort carbonizing benches, let us first consider only those which have been declared a success by a number of gas engineers in England, namely, the Glover-West and the Woodall-Duckham systems. The Glover-West require very small ground area for their installation, as only 8 retorts are placed in 2 rows of 4 in one setting. Retorts are of smaller cross-section at the top than the Dessau, but almost alike in dimensions at the bottom. However, they are made 20 feet long. The generator runs from the grade level to a height of 12 feet, and is similar in design to the Dessau, but the generator gases are taken off in the rear of a curtain wall and led to the top of setting. To this upright distributing flue are connected a series of nostrils which empty into the combustion chamber and are about 8 in number, one above each other. The supply of gases is regulated by a damper in the main distributing flue. No combustion takes place within 4 feet of the retort tops, and this space, termed "circulating chamber," has the advantage of never being overheated. The setting is divided into two compartments by a firebrick wall, and the retorts have division plates of tile set between them so as to direct the gases over the entire surface of the retorts, and these do not travel upward in a zigzag course as in the Dessau, but run downward, then through recuperator flues, finally discharging into separate chimney stacks located on top in rear of benches. The whole bench approaches in plan nearly the shape of a square with the generator standing slightly in the front at a projection of about 30 inches. The details of the setting are not complicated, as the whole of it is built of tiles to suit the taper of the retorts. Nine tiers of flues are arranged for the travel of the generator gases. The heating of the secondary air is attained by recuperator flues located on either side of the generator gas distributing flue, the inlet of the air being situated on the charging floor level. The primary air is introduced in the old manner and no steam developers are used.

The Woodall-Duckham system has many principles of the above described benches, yet possesses a number of distinct and interesting parts for our study. The generator of the latest design is very narrow at the bottom, minus an ashpan, while at the top it widens out to about 4 feet and is arched over. The gases are taken off at the middle and conducted to the top of the setting where distribution takes place by means of dampers. The recuperator is located in the rear of the bench, or on opposite side of generator. There are a number of tiles used in horizontal rows, and to each side of these the waste gases pass on their upward course to the chimney.

As combustion takes place at the top, the waste gases must necessarily travel downward, and here a similarity exists with the Glover-West, only in this form, as the gases go in zigzag course and are led in this manner by long baffle plates. Four tiers of flues are built for this purpose. The retorts are usually made longer than any other of this character and seem to be tapered slightly more than the Glover-West. This may appear so by reason of the additional length. In general design both types embody accurate study of practical and scientific principles. The generators are large and of correct cross-section. Gas take off is at the proper place. Ample grate area is given, the generator of the Glover-West bench having a shade of advantage over the other one. We cannot consider the mechanical devices for continuous charging and discharging, as these would necessitate an entire paper for their study. Let it suffice to say that alterations have been made from time to time, and finally improved and perfected to such extent that both types of benches are now equipped with easy and efficient operating machinery.

Several other benches of this kind have been designed and built but not on any extensive scale. Mr. W. R. Herring (Edinburgh) has constructed a bench with 8 vertical retorts, each fired independently and supplied with producer gases from outside generators, the combustion flues being arranged between the two rows of retorts. A mechanical feed of new invention is located over the top of the benches and a screw propeller feeds the coal to the entire battery. Adjustments can be made at each retort. M. Paul Parsy has patented a form of vertical retort bench which, however, approaches more the intermittent chamber setting. Two sides of the structure are devoted to the retorts, while the center portion constitutes the generator. The heating of the retorts is effected by vertical open flues arranged between each, the gases coming in at the sides, going up-and-down, then passing the usual route through a set of recuperators which are below the floor level, then out into a main waste gas flue and to chimney.

The Bunzlauer Werke, Lengersdorf & Co., in Schlesia, not long ago built a vertical retort bench in which they claim, from 2 to 20 retorts can be operated independently. In other words, the capacity can be suited to the daily consumption of gas. A bench with 10 retorts is divided into 2 rows of 5 each, and these again are blocked off to form series of two. One combustion chamber serves 2 retorts and the recuperator is likewise cut into sections to serve only the 2 retorts or the entire 10. The gases for heating are brought from outside producers and conducted in 2 upright flues into the setting. The retorts are heated, from the bottom up, very similar to the Dessau benches. The secondary air enters the generator gas nostrils and can be regulated with small fireclay slides or brick. The waste gases pass downward in a center division wall, then separate into the sectional recuperator directly below discharge floor level, going back-and-forth in the horizontal flues, 8 of which are provided, finally discharging into a longitudinal waste gas flue built below the grade level.

A New Process for Producing a New Low-Priced Gas Mixture from Coal.

United States Letters Patent have been just issued to Mr. George A. Bronder, of 309 Broadway, New York, for a process securing a gas rich in British thermal units, which seems worthy of more than passing mention. This mixture is obtained by extracting all the gas contained in the treated coal and coke, reducing the same to ashes and clinkers, the ammonia and tar being extracted at the same time. The calorific value is about 435 B.T.U. per cubic foot; the specific gravity is about 0.48; and it is non-condensible and highly compressible. In the treatment 1 pound of coal yields about 20 feet of gas.

The plant for making this mixture is simple and its cost is hardly more than half that of an ordinary plant of like capacity, and as the cost of manufacture is reduced considerably in consequence, the mixture can be produced at low price.

About 27 feet will yield 1-horse power, and its heating quality is as stated above. Although it has low candle power (like natural gas) it gives a high flame temperature in the mantle for equal quantities of gas.

Its main use, however, is intended for the heating of residence houses and other edifices, where it compares favorably with the cost of coal. Being easily regulated by a thermostat, the temperature of the rooms can always be kept even and does away with all storage of coal, the handling of furnace ashes and clinkers and attending the furnace.

In connection with this gas mixture a heater has been tested in a modern house for the past winter, using gas as fuel, and applied to existing steam coils, in the so-called indirect way, where fresh air is taken from the outside, heated by the steam coils and distributed over all the rooms in the house. The particular house is a detached one, having 37 windows and 40 doors. It stands on a corner plot of 6 city lots, next to an open plaza. It required 75,000 cubic feet of gas per month to heat it through the cold winter season.

The heater is built to assure absolute safety, the air required for the gas burners being taken from the outside through a pipe. The heater is absolutely tight, so that no gas can possibly escape into cellar or house, and all waste gases are led into the chimney. The waste gases have a temperature of only 92° to 104°. The heater can be applied to existing heating sysems, either of steam or hot water types.

When this gas is used to produce power or to generating electricity, it will also, in a great many instances, compare favorably with coal, the cost of the original installation being much lower as well as that of operation.

Mr. Bronder, in furnishing this advance information, preferred to wait until certain drawings were made to illustrate the text of a technical description of the apparatus, plan of construction and method of operating.

[OFFICIAL REPORT.—AS FURNISHED BY THE SECRETARY.—CONTINUED FROM PAGE 804.]

PROCEEDINGS, FORTY-FIRST ANNUAL MEETING, NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.

SECOND DAY, MORNING SESSION.

The President here called upon Mr. H. K. Morrison, of Concord, N. H., who read the following paper on

CONSUMERS' EQUIPMENT AND INSPECTION.

Within the memory of most of us gathered here great changes in method in many branches of commerce have come about, and not the least in that of the lighting industry. Changes in methods of manufacture, due to invention and scientific investigation, have preceded the greater differences that can be noted in the commercial side. Then the customer received curt and short treatment who dared "beard the lion" and make complaint. In one office "no kicks less than a dollar" was not infrequent, and the offender was referred all too often to the plumber with results like a red flag to a bull.

With the emphasis laid so heavily on the selling end of our business, the question of our attitude toward customers at once becomes important. Much has been said and written on this matter and many ideas and excellent plans have been suggested and carried out. We have maintenance methods, the systematic inspection schemes, all forced upon us as a means of self-preservation, in this hustling, hurrying age. Commerce grows in method and enormously in volume. Not only is the farmer interested in making grow 100 bushels of corn to the acre where but 50 grew before, but the gas man, too, is interested in selling 30,000 per year where formerly he could dispose of but 15,000.

Place over against the question, "What are we doing for our consumers?" the question, "What are our consumers doing for us?" and one reson for this change in method is apparent. Without our consumers we would be without our business. With our consumers dissatisfied growth would be slow and its cost excessive. With every consumer satisfied, advertising us and our business, we have a combination of workers that makes for quick results at minimum cost. This is our aim; this the standard toward which we work, and the benefit derived all along the line is mutual.

The meaning of "service" to us must include both the quality of the article sold and the uninterrupted delivery under proper conditions, also the delivery through the best and most efficient appliances. To one man, the efficient burning of a single burner may seem as important as the economical running of a 50-horse engine to another.

The advertising value of perfect service must be large indeed. The query as to how we are to reach this standard seems to be answered by systematic inspection of all consumers' appliances, from the open flame burner through every opening, through the much abused meter to the service pipe itself. Such a scheme continuously carried out will eventually place us at least near the standard. This plan was first suggested by Mr. Rollin Norris and has been carried out in some of the plants in which he is interested. The scope of the work will be seen from the form of the return card shown here.

As the record of each house is to be permanent, a suitable cabinet for filing is used for these cards. At the top you note the address. Then follow in order the appliances in use reduced to burner equivalent. The size and length of the service and size of the meter show whether that portion of the system is ample. The record of the individual appliances inspected, found satisfactory to the inspector, with what was done or ordered done, follows.

The man to undertake this work will be one of the best. A man of patience, persistence and not easily ruffled. He must be up in "gas etiquette." He will be shown into every house in your city and will meet all kinds of treatments and receptions. He must turn each and all to the good of the business. If he has ability as a salesman, so much the better. He will have many opportunities to suggest improvements in equipments. The table (page 848) gives the result of such inspection in several plants where it has been followed. The average number of visits made per day will be close to 20.

ADDRESS..... FLOOR.....

NAME..... DATE.....

APPLIANCES INSTALLED

FUEL	No.	EQUIV. BURNERS	LIGHT	No.	EQUIV. BURNERS
RANGE			FLAT FLAME BURNERS		
HOT PLATE			UPRIGHT INC. SINGLE LIGHTS		
CIRCULAR WATER HEATER			INVERTED " " "		
INST. " "			UPRIGHT INSIDE ARCS		
AUTO INST " "			INVERTED " "		
HEATING STOVE			UPRIGHT OUTSIDE ARCS		
			INVERTED " "		
TOTAL			TOTAL		

SIZE OF SERVICE.....LENGTH.....SIZE OF METER.....

USING RANGE ..... KIND ..... No. .....

BOILER USED.....BAKE O. K. .....S' & OF PIPE RUN.....

KIND OF OVEN.....REPAIRS NEEDED.....

ORDER TAKEN.....IF NOT, WHY? .....

WORK DONE .....

USING HOT PLATE ..... KIND ..... No. .....

No. OF BURNERS.....HOW CONNECTED.....

GAS SUPPLY AMPLE.....BURNERS IN ADJUSTMENT.....

AIR SUPPLY ADJUSTABLE.....WORK DONE.....

USING CIRCULATING WATER HEATER ..... KIND..... No.....

CONDITION OF HEATER.....REPAIRS NEEDED.....

ORDER TAKEN.....IF NOT, WHY?.....

OPERATION SATISFACTORY TO CONSUMER.....

IF NOT, WHY?.....

WORK DONE .....

USING INST. WATER HEATER ..... KIND ..... No. .....

LOCATED IN.....HAS FLUE CONNECTION.....

VENTED INTO.....CONDITION OF HEATER .....

OPERATION SATISFACTORY .....

WORK DONE .....

CONSUMERS' EQUIPMENT INSPECTION

(Form 274)

(Front.)

USING SPECIAL APPLIANCES

KIND ..... No. ..... FLUE CONN. .....

KIND ..... No. ..... FLUE CONN. .....

CONDITION .....

.....

WORK DONE .....

LIGHTING APPLIANCES

PREMISES—HOW LIGHTED: GAS.....ELECTRIC.....GASOLINE.....OIL.....

CONDITION FLAT FLAME BURNERS.....

No. PUT ON.....

USING UPRIGHT INCAN......KIND ..... No. .....

CONDITION .....

WORK DONE .....

ORDER TAKEN .....

USING INVERTED INCAN......KIND ..... No. .....

CONDITION .....

WORK DONE .....

ORDER TAKEN .....

USING INSIDE ARCS .....STYLE ..... KIND ..... No. .....

" " " ..... " ..... " ..... " .....

CONDITION .....

WORK DONE .....

ORDER TAKEN .....

USING OUTSIDE ARCS.....STYLE ..... KIND ..... No. .....

" " " ..... " ..... " ..... " .....

CONDITION .....

WORK DONE .....

ORDER TAKEN .....

USING MIS. LTG. APP......KIND ..... No. .....

.....

WORK DONE .....

.....

EXAMINE METER & CONNECTIONS .....

DOES METER SET AT HEAD OF SERVICE.....

CONNECTIONS IN GOOD CONDITION.....

SHELF UNDER METER.....

.....

BRANCH SERVICE.....TAGGED.....NUMBER.....

.....

GOVERNOR STYLE .....SIZE.....

.....

.....

SIGNED.....INSPECTOR.

NOTED..... FOREMAN.

NOTED.....NEW BUSINESS MNGR.

(Back.)

Perhaps the average of these figures will represent what you will find in your own situation, about as follows:

Ranges found satisfactory.....	60 per cent.
Hot plates found sat isfactory.....	88 "
Circulating water heaters..... ...	83 "

Daily Record of Inspection of Consumers' Equipment.

	A.	B.	C.	D.	E.	F.
Calls made	936	3,378	358	2,135	254	1,309
Admissions	857	2,734	265	1,903	204	919
Ranges.						
Inspected	306	1,207	140	417	182	682
Satisfactory	152	883	136	201	69	332
Adjusted and small repairs by Inspector	152	261	7	216	113	335
Repair orders sent to shop	2	66	5	....	3	18
Hot Plates.						
Inspected	275	455	75	195	68	93
Satisfactory	222	447	73	152	51	76
Adjusted and repaired by Inspector	53	8	....	43	17	15
Repair orders sent to shop	....	...	....	....	2	1
Circulating Water Heaters.						
Inspected	24	84	46	114	54	40
Satisfactory	20	80	45	81	45	29
Adjusted by inspector	1	3		33	9	4
Repair orders sent to shop	3	1	....	....	....	5
Instantaneous Water Heaters.						
Inspected	14	5	3	5	11	129
Satisfactory	10	4	2	4	7	101
Adjusted by Inspector	4	....	....	....	3	21
Repair orders sent to shop	....	1	1	1	1	7
Special Appliances.						
Inspected	111	215	14	92	16	36
Satisfactory	107	208	12	90	16	33
Adjusted by Inspector	4	7	....	...	....	2
Repair orders sent to shop	....	...	1	2	...	....
Upright Incandescent Burners						
Inspected	1,131	1,363	72	1,202	499	311
Satisfactory	1,040	1,353	63	1,048	331	264
Adjusted by Inspector	91	2	....	154	168	36
Repair orders sent to shop	...	8	....	. .	6	11
Inverted Incandes. Burners.						
Inspected	112	1,385	25	803	311	255
Satisfactory	97	1,355	21	597	225	179
Adjusted by Inspector	15	29	1	206	86	60
Repair orders sent to shop	....	1	....	....	3	16
Inside Arcs.						
Inspected	7	181	1	156	1	29
Satisfactory	7	180	....	154	1	29
Adjusted by Inspector	....	....	....	2	....	....
Repair orders sent to shop	....	1	....	....	...	....
Outside Arcs.						
Inspected	4	23	...	26	....	1
Satisfactory	3	23	....	26	....	1
Adjusted by Inspector	....	...	....	...	....	....
Repair orders sent to shop	...	....	....	...	....	....
Misc. Lighting Appliances.						
Inspected	1	14	3	6	30	96
Satisfactor.	1	14	1	6	28	65
Adjusted by Inspector	....	....	....	....	2	18
Repair orders sent to shop	....	....	....	...	....	3
Flat Flame Burners.						
Inspected	5,262	19,305	634	17,181	1,483	6,371
New burners put on	1,216	2,021	77	2,644	79	983
Meters and Connections.						
Inspected	704	2,113	213	1,261	254	839
Satisfactory	690	2,070	194	1,245	208	726
Leaks found	2	6	....	4	....	5
No support under meter	10	15	16	29	43	113
Orders to repair connections or meter changes	6	28	37	6	45	116

This means that 40 per cent of your ranges need some adjustment or repair. It may be the consumer takes it for granted that the stove or appliance is in normal condition, and, therefore, does not make complaint. The visit and adjustment please the consumer, and some will be found who gladly pay for it. Note the number of open-flame burners "ready to serve," as compared with the incandescents—nearly 7 to 1.

No trouble is found on the part of the consumer with regard to making these inspections; in fact, they are grateful for this gratuitous attention. Those who are carrying on this work are well satisfied with the result and favor its continuance as a regular part of the routine of the distribution department. It is not believed the net cost will be greatly increased as many complaints are anticipated, many repair parts sold at a profit and considerable new business turned in.

Discussion.

The President—We have listened to an interesting paper on an interesting subject. We have been told that Mr. Norris is the father of this idea. I would like to ask him if he has anything to say about his child.

Mr. Norris—This, of course, is merely an effort to systematize what has been done to a greater or less extent pretty generally everywhere, and is an endeavor to see just to what extent it is worth while to do this work. I might say that there is some indefiniteness in regard to what is satisfactory adjustment, so that the real disposition of the particular man doing the work will affect his report as to conditions he finds. Of course, the proper adjustment of a burner is not an absolute matter. While the adjustment as observed may not be exactly right and may justify some slight change, it does not mean necessarily that that particular appliance is giving bad work at the time. I just mention this because it looks as though an unduly large proportion of the ranges which were inspected was unsatisfactory. I don't think they were all unsatisfactory, but that they were sufficiently out of adjustment to warrant making some slight change, and in some cases, of course, considerable change. One other point. I think it extremely important in doing this kind of work to have the man doing it a thoroughly competent mechanic. It is a mechanic's job, and he should not, I think, get sidetracked in an endeavor to do too much selling. That is my personal opinion. It is debatable point to what extent this inspection should be dovetailed in with selling. I think it should be kept as separate from it as possible, and that business prospects developed by this inspection should be turned over to a competent salesman.

Mr. C. A. Learned—We represent here all sizes of works and it may be possible that most of the members have already taken card indexes of their districts. It may, however, be true that there are a good many of even the larger companies that have not taken such card index. If the company is a very small one the work to be accomplished may be small, but it needs somebody at the office to look over those cards to get the information out of them. Mr. Morrison's paper represents a condition where all kinds af information are obtained. In the small company the first thing you want to know is perhaps how many ranges there are in the district, how many houses there are in front of your mains, how many services you have and how many of these are dead. This was of particular interest to me, because some few years ago I started out on a house-to-house canvass, a card for each house and each tenant in our districts. The first canvass was quite incomplete. I began to learn my story, but as we started it another year we got more information. There was one item that rather interested me; it really came from "Brown's Directory." Two questions are asked of you who give reports to that publication. One is, population of district supplied. I could never answer it, but I said to myself, "I will find it out," because I thought it would be the simplest thing in the world for our man, after obtaining the information of what was desired, the size of stove, the name of stove, the water heater used, how many rooms are piped, what is the name of the tenant, what is the name of the owner—and in some cases part only of that information, because there is no service—to ask as his last question: "How many people are there in the family?" It doesn't make any difference if they are babies; he takes the whole number. Those of you who have taken this class of index, particularly those who have gone into it as exhaustively as the writer of this paper, have obtained very important information; but those of us who have not gleaned as much information have been very much surprised to find, perhaps, how many stoves and dead services there were, and how many houses were not piped for gas. I confess I was very much surprised. It is very valuable information. It puts you in touch with the situation with your consumer, and it gives you an opportunity to do a good deal of real, genuine, direct work, which is obtained from such an index. The system of card index may be accomplished in a great many ways. I have found good results by taking some outside men and giving them a cent a card for the information in a fairly well populated district. I have increased that price to as high as 2 cents a card where the district was sparsely populated.

Mr. Slocum—Right along that same line, Mr. Learned (he and I are neighbors) said that he got many cards for one cent each, but sometimes paid as high as two cents. I would like to say that the registrars in our town were obliged to take such a card index, and they lost money on it at four cents each. So you can see the advantage of a private management over a city management of the same thing.

Mr. J. A. Gould—What nature of labor has Mr. Learned in Connecticut? The estimated amount of Mr. Morrison is 20 inspections a day. If Mr. Learned pays a cent each for 20 cards, and even if he raises the number of inspections to 40 a day, what kind of labor does he generally have there?

Mr. C. A. Learned—I stated in the first of my remarks that the index to which I referred was entirely different from Mr. Morrison's. There may be as many as 8 or 9 questions asked by my man. He can get that information generally in less than 5 minutes. Labor is all right in Meriden.

Mr. Ware—In Boston we started some months ago a short inspection purely for information, but have only made about 700 calls altogether. Some of the information that we have got is rather interesting. The total number of open flame burners examined was about 6,800, of which 2,900 had to be replaced, or about 42 per cent. Of mantle burners there were 1,100; 9 per cent. of those needed cleaning and 7 per cent. were replaced. I think that is rather an unexpectedly good showing for the general condition of mantle burners. I suspected it was much worse. General statement about lighting: 39 per cent. in good condition; 25 per cent. in fair condition; 36 per cent., bad. Of the stoves, 314 were good—that is, 63 per cent.; 23 per cent., in fair condition; 14 per cent., poor. May I add that we have for a good many years done gratuitous work on open flame burners, stoves and appliances, and it has been pretty generally understood throughout the district that stoves would be put in condition and reasonable adjustments and changes made, on request, so that the showing there is pretty good. Hot plates: 87 per cent., good; 10 per cent., fair; only 3 per cent., poor. There is not very much about a hot plate to get out of order anyway. Water heaters: There were only a few in the district examined, so that the showing does not mean very much. Out of 21 examined, 15 were good, 5 in fair condition, only 1 poor. Of the lighting examined, 86 per cent. was in open flame burners. The great bulk of our business still is lighting, and plainly, try as we may, the great bulk of it is still open flame burners. Now, is it worth while from an advertising standpoint to face the fact that 42 per cent. of that great bulk of our business is not doing us any particular credit? It seems to me that on the lighting alone, leaving the appliances out of the question, an inspection of this nature is not only desirable but is necessary under our present condition. If people are going to use open flame burners it certainly is to our advantage to see that they get the best service out of them.

Mr. Barnum—Mr. Ware states that he considered the great bulk of our business is lighting. Does he consider that so, the year round? Is that his experience?

Mr. Ware—I think that is the average for the year. Of course, the fuel business is growing; but from the fact that our winter peak is so very marked it seems to me pretty conclusive proof of where most of it is going.

Mr. Crafts—Mr. President, I feel that perhaps the very weakest point there is not the way that the gas business is conducted, but this very question of taking care of the consumer after our gas has passed the meter; and, from what I have seen of conditions, I think perhaps the lighting end stands out as the greatest trouble to-day. I have thought of this considerably, and tried in a good many ways to meet it, but we have not met it to my satisfaction. When we set a meter we go over all the burners and appliances, we put Bray burners on every open jet in the house and do see that the incandescent burners are properly adjusted; but a good many Welsbach and other incandescent burners are put out, and from the complaints that we had I think anyone of us would be surprised if those burners in any one town could be lined up and we could see the condition in which they are. As to the best way of doing that I don't know. The inspection system—or the preliminary inspection system—of Mr. Morrison does get you started in the right way, and there is no question but that is a splendid work; but after you have had your first record it must be followed systematically. Of course, we know that to take care of a burner we don't have to visit it once a month, but I believe that after we have our record—and the record would last for perhaps a year with slight changes—we should follow this up systematically and regularly.

The President—Mr. Burr, have you anything to say on this subject?

Mr. Burr—I don't know that I can say very much. Of course, the aim is to increase gas consumption. After we get a record of appliances and their condition, etc., the next thing to do is to try to increased sales. We are trying the new method in New Haven of getting a record from the consumers' ledgers of all the decreases in consumption, which record is given the New Business Department. As soon as any decrease is shown a representative is despatched at once to ascertain, and from that we proceed if possible to build up. I have always had the feeling that a card record was good as far as it went, but after you have the record how are you to get it in shape so that a solicitor can use it to advantage except at considerable expense?

Mr. Norris—Some emphasis has been laid in the discussion on the record phase of this work. Primarily this work is not done for the sake of getting records. The main thing is to get the work done and the record is a secondary matter, so as to show what has been done and to direct us in the best way of doing work in the future. As far as the effect of this work on the gas sales to any individual consumer is concerned, I might say the whole stability of our business and its growth depend, I think, upon the economical use of our product by our consumers. Much of our reason for doing this inspection work is to help the consumer burn our product economically, and it is quite natural that, in a good many cases, the immediate effect of such work will be to induce the consumers' bill; but the effect of such reduction will be that the next man who is not burning gas will burn gas, and the total result is an increase in our sendout. The main thing is to get the work done right, so that the consumer will utilize his appliances and get the most good he can out of the material he is buying from us.

The President—Do you consider the point also of having a satisfied consumer instead of having him go on to electricity?

Mr. Norris—That is all part of it, of course.

The President—Mr. Nute, have you anything to say on this subject?

Mr. Nute—I have in the year past been making a house-to-house inspection of all appliances, and, without looking up the actual records, I should say it resulted in a diminution of the consumption. We found a great many jumbo burners, and many other kinds of inefficient burners, for which the people had generally paid high prices. We have taken them out and substituted a good Bray or incandescent burner for these extravagant and wasteful ones. It seems to me the object of this inspection is for the satisfaction of the consumer rather than the increase in gas consumption. I think we have accomplished some very good work along that line.

Mr. Farrow—In Cambridge we have started on this house-to-house—not exactly inspection, but a personal interview, wherein the consumer answers several questions. This seems to me likely to be of great value not only to the commercial but to the complaint department; that is, complaints of large bills, etc. I look at it in this way. When a consumer coming into the office complains of a large bill, it would be a very simple matter to refer to this record, providing, of course, it is indexed properly, then the man who looks after that complaint can go prepared to meet the conditions of the burners, or stove, or whatever might be there. For instance, a consumer makes complaint of a large bill and it is turned over to the man to investigate. He can look up the consumer's record and go prepared to put on burners or adjust the stove, whichever it might be, and satisfy the consumer right then and there, and kill the complaint. It seems to me that this in time will work out very satisfactorily.

The President—I will ask Mr. Morrison if he has anything to say in rebuttal.

Mr. Morrison—Mr. Ware asked the question as to the specific effect on consumption. I don't think we have run this long enough to be quite able to say, except in a general way, that it will have an effect. The other question asked was as to how the prospects gotten from such an inspection were to be turned into new business. I think Mr. Norris answered that question. It is not primarily a new business scheme, although there will be a great deal of new business developed from it, but prospects should be turned over to the other department. While this work is carried out by distribution men they are not primarily to enter into the field of new business, but the prospects will be turned over to the salesmen. I think this table, which represents what has happened in six different plants, will, if you study it, be very interesting. The question of how many open flame burners are actually in use is a very difficult one to decide. I think, while there may be 7 to 1 ready to be used, the number of hours burning which the incandescent burner uses must be a great deal more than that of the open flame. I speak from the standpoint, of course, of a smaller town; I don't know how it is in larger cities where so many stores still have open flame burners. Mr. Ware says that the peak load indicates very plainly that many open flame burners are being used, which is undoubtedly the case.

On motion of Mr. C. A. Learned a vote of thanks was passed to Mr. Morrison for his interesting paper.

The President—That completes our programme of papers. The matters left are topics for discussion. Four of them are important. Taking them in order: First is "Automatic Street Lighting." Can anybody tell us about automatic street lighting? No one seeming to have the information required, I will pass to the next one.

Mr. Spear—I think perhaps I can make a remark or two on that. We have installed within about ¾ of a mile of the Roxbury works 93 lights, 43 of one type and 50 of another. The 43 lights have been installed since last March, making about 10 months' use, and the 50 have been installed since the middle of September, making just 5 months' use to the middle of this month. The first lot of 43 lights was without chimneys, the second lot has chimneys. They have been working with varying success. The average failures on the whole I should judge would be about 2 per cent. Some nights they are all lighted, and they are all put out some mornings, but generally we have one or two failures, sometimes from frost, sometimes from a defect in the lamp. The mantle use on 43 lamps equals about 1.7 per month, and the other about ½ a mantle per month. The large use of mantles on the first lot is due to the instability of the frame of the lantern itself, its construction and the wind. The other lamp does a little better. Many of the outages and failures have occurred during the first installation of the lamps, and from my computations I find that, taking all of the failures, one type of lamp fails to light—that is, each lamp of the system fails to light—about once in every 1.8 months, or every 54 days, and the failure to put out amounts to each lamp failing to put out once in 5 months, or 150 days. On the other system it is rather the opposite. The failures to light amount to each lamp being not lighted once in about 2.1 months, or 63 days, and the failure to put out 1.3 months, or 39 days. I should not want to say much as to the merits or demerits of either system; the city is now open to contract by the companies, and I would not want to say anything prejudicial to any. We light them by impulse from the governor house at the Roxbury station, putting on an impulse of about 6½ inches at night some 15 minutes after the general lighting time of all the city lamps, and we put the impulse on about 5½ inches in the morning. This is effective at the rate of about on an average of 4.8 inches pressure ¾ mile away at night, and practically the same in the morning, because there is then less consumption to take up the impulse. The impulse is rather less effective during the winter months (that is, long distances away) than in summertime, on account of the lighting and cooking period coming together. We find more difficulty generally in operating the lamp at this time. We are supposed to operate about .6 to .8 inch above the normal pressure of the distribution system, but we put on a little more, so as to be sure that it will be effective. I think any company adopting that system would have to put considerable thought in the direction of the operation of the impulse. Where outside holders are on the distribution system, without governors, the holder is rather apt to respond to the impulse quickly, making it less effective on the lamp. To say nothing further about that, I would say the impulses we find from experiment are quite effective, and almost instantaneous some few miles away; in fact, we have lighted both types of lamps that have been installed something over 6 miles from the station. That was during the long days. I don't think we could do that now, except by secondary impulses at the outside operating stations; that is, impulses made at the same time as those at the central station.

Mr. Norris—As I understand Mr. Spear, he has two kinds of automatic lighters.

Mr. Spear—Yes, sir.

Mr. Norris—And they are both operated by a wave of pressure?

Mr. Spear—Yes, sir.

Mr. Norris—Would it be all right for Mr. Spear to state the names of the two systems that he is experimenting with, or does he for any reason prefer not to do so?

Mr. Spear—I think there is no objection to stating the names. One is the Kitchman lamp, the other is the Monand lamp. The Monand lamp is put out by the Monand Pressure Lighting Company, and the Kitchman, I understand, is the same lamp that has been or is now used in Springfield. The latter is a diaphragm lamp; that is, the light is operated by pressure of the gas upon the diaphragm, which in turn operates the valve. That valve system is operated by a cam. The diaphragm in operating moves the cam of a clock, starts the clock working and opens the valve admitting the gas to the burner. The same action puts it out in the morning. The Monand lamp is operated by an impulse of pressure of the gas upon a drum which rises and falls in mercury. That operates a valve, or what we would call an actuator, which operates upon two pins entering a small orifice, cone-like pins, which admit gas to the burner and to the mantle.

Mr. Gould—One thing which might be misunderstood is that the term impulse does not mean the net impulse; it means the total pressure. The nominal pressure being about three inches the total pressure is about 6½ inches. The actual impulse is only about 3½ inches.

Mr. Spear—I should say that impulse is maintained about 2 minutes. We tried different times. We started with 5 minutes reducing gradually, until now we maintain it 2 minutes, and that proves effective.

The President—The next topic is "Meter Connections, Shelves and Curb Shut-Offs." I will ask the originator of that subject to state why he did it and what he wants to get. Mr. Barnum.

Mr. Barnum—I suggested that subject, not that I had anything special to say, but I would like to get the general practice in this part of the country regarding it. We have been putting shut-offs on the services for many years in the central part of the city (what is known as within the fire limits), where only brick buildings can be erected, and we put a shut-off on every service within that district. Wherever a street has been repaved we go through the street and put in shut-offs on every service, putting in the Chapman valve instead of a cock. It is rather an expensive construction, but no matter how long it is in there, having a babbitt seat, it is available when you wish it. The city recently introduced an ordinance directing us to put a shut-off on every service in the city. I want to know if any other city does that. The question of shut-offs in the sides of the building has been talked in our Fire Department Committee. They suggest some kind of an automatic shut-off should be put on the end of the service. We now put in the ordinary gas cock, and there is one at the end of every service in the city. We use a special bronze casting for that cock. I said it is an ordinary cock; but it is a little heavier than the ordinary cock, and made with our initials on it. We have just made some experiments with regard to meter connections and shelves. The shelf problem, of course, is rather an aggravating one, to always and under all conditions get one that will be satisfactory. The question now comes up with these new meters with the riveted clips on the side and iron pipe connections, which we are now starting to use, is it necessary to have a shelf? If anybody has started to use these iron connections with riveted clips I would like to know whether he is continuing to use a shelf or not.

Mr. Sucher—New Haven has an ordinance which demands that we put a shut-off on every service supplying a public building. We do not use shut-offs on private houses, but we do put them on all services to public buildings, factories, etc.

Mr. J. J. Humphreys—Mr. Barnum asked if anyone had shut-offs on all services. I have about 30,000 shut-offs, and consider I have about $60,000 tied up rather foolishly, because we have 30,000, and we are only putting in 700 or 800 services a year. I am continuing it because the boxes are all numbered, and that forms a service record making it very easy to attend to the service repairs. We keep them in use by turning the cock off whenever they want to shut off a meter. But I think it is a very expensive system of record, and unless we have a service over 2 inches I don't think the amount of gas escaping into a house which is already burning enough to burn these connections off, and pipes, is going to add much to the conflagration; but I do think that every service over 2 inches should have a shut-off outside. Our services are all 1¼-inch.

Mr. Kennedy—I suppose we are somewhat similar to Boston; I don't just know. We have a service gate on every public building, factory and dwelling house with 3 tenements or over. I would not like to say whether I think them "rot" or not.

Mr. C. A. Learned—I suppose the ideal condition would be a shut-off cock at the curb, a meter shelf and all iron connections. We, however, who run smaller works, have a great many lead connections. It has come to my notice within the past year or so that, because of the very large number of prepay meters, it is wise to put shelves under every meter. In Meriden we have 5,000 prepays and 2,500 plain meters, and found that, on account of the action back-and-forth of the knob on the side of the meter, where lead connections have been used, the connection finally works loose under the coupling or nipple, or any device you may have for connecting. We came near having a disaster within a month. A woman put the money into her meter and sent word to the office there was a leak. Our man got there in time to find her kneeling on the floor—she was a woman weighing over 200 pounds. He threw open the windows, helped her up and got her out on the piazza and thus saved her life. We are installing meter shelves everywhere, and we are doing more work with iron connections.

Mr. Anderson—I would like to ask Mr. Learned how much the man weighed that was on that job.

Mr. Barnum—A good example of "ready-to-serve."

The President—The time has come when if we are going to Providence we ought to get out of here. I would suggest that the last two topics be referred to the next annual meeting. Gentlemen, I declare our 41st session adjourned.

The Flow of Heat Through Furnace Walls

"Bulletin No. 8," issued this month by the Department of the Interior, Bureau of Mines, is devoted to a description of the research work of Messrs. Walter T. Ray and Henry Kreisinger, which has to do with the matter named in the heading. The "Bulletin" contains a statement of certain results that will be embodied in a report describing investigations of the combustion of fuel made by the United States Geological Survey and the Bureau of Mines in a specially constructed long furnace. The furnace forms part of the fuel testing plant of Pittsburgh, Pa., which was established and equipped by the Geological Survey, but passed under the control of the Bureau of Mines on July 1, 1910, when a transfer of fuel testing investigations, authorized by act of Congress, became effective. The work discussed in this bulletin was done under the direction of the Geological Survey.

The furnace was designed and built for an experimental study of the processes of combustion, this study being part of a comprehensive plan for testing fuels to determine their heat value and the manner in which they can be used to best advantage. Although the main object of the researches made with the furnace by the Geological Survey was to examine critically the production of sensible heat by combustion along the path of the gases rising from the fuel, an interesting as well as important side problem developed in the study of the simultaneous dissipation of the heat through the walls and roof of the furnace. Thus, incidental data were collected on the temperature gradient through the walls at several places. These temperature data (together with the heat conductivity of the material of the walls) formed the basis for calculating the heat dissipated through the walls.

The object of the report is to present and discuss these temperature data. The discussion particularly concerns the air space type of wall construction as compared with the solid brick wall or walls type, in which the air space is filled with some solid material of low heat conductivity. The conclusion of the authors, which perhaps will surprise some readers, is that, so far as loss of heat is concerned, a solid wall of brick or any ordinary material is preferable to a hollow wall of the same total thickness, especially if the air space in the hollow wall is near the furnace side.

There is a general belief that, since air is a poor conductor of heat, air spaces built into the walls of a furnace will prevent or reduce heat dissipation through the walls. Although there may be instances of furnace walls in which such construction reduces the rate of heat flow through them, yet as a rule the effect of the air space is just the opposite. While the heat does travel very slowly through the air by conduction, it leaps over the air space readily by radiation. Although this latter mode of heat propagation is common in nature, the laws governing it are not generally known and are seldom taken into consideration when furnace walls are being designed.

It may be stated here that the quantity of heat passing through a portion of a solid wall by conduction depends on the difference between the temperatures of the two planes limiting the portion of the wall. The quantity of heat that passes across the air space in the wall depends on the difference of the fourth powers of the absolute temperatures of the surfaces inclosing the air space. It follows that, in case the heat passes by conduction through the solid portion of the wall, the loss remains approximately the same so long as the temperature of the two limiting planes remains constant, no matter what may be the temperature of the two planes. On the other hand, the heat passing across the air space by radiation increases rapidly with the temperatures of the inclosing surfaces, although the difference between these temperatures may remain constant. The important point is that the air space, which is advantageous in the walls of a refrigerator because the temperatures are low, is objectionable in a furnace wall because the temperatures are high.

It is customary to put air spaces in furnace walls between the firebrick linings and the common brick. Usually the firebrick lining is only a half a brick thick, which construction brings the air space too close to the furnace. The result is that the temperatures of the surfaces inclosing the air spaces are too high, and in consequence too much heat is radiated across the spaces. The heat passing through such walls would be much reduced if the air spaces were filled with brick, or better, with some cheap non-conducting materials, such as ash, sand, mineral wool, etc. Even where the firebrick lining is one brick thick (9 inches), the temperature in the furnace may be high enough to raise the temperatures of the air space surfaces so much that the heat radiated across the space will amount to more than would the heat conducted through a filling, were the filling only common brick. This last statement is amply justified by the data presented. The authors also especially thank John K. Clement, physicist, and his assistant, L. H. Adams, both now of the Bureau of Mines, for their aid in devising methods, taking many of the observations, and assisting the authors in studying data.

Qualifications of a Successful Manager of a Public Service Corporation.

[Prepared for the Third Annual Convention of the Pennsylvania Gas Association, by C. W. Butterworth, Milton, Pa.]

In order to be successful as a manager of any business, whether an individual enterprise or a public service corpo ration, the principa necessity is to have a knowledge of the proper qualifications. To the successful manager of a gas company he should be conversant with every department of the company. Be a wideawake commercial man, identify himself with all public movements in the town in which he is operating, be one of the best known men in his town, be thoroughly in touch with the representative men of his town, and be so located in the main gas office that it will be no trouble to obtain an interview with him at all times.

To be a successful manager he should be as close as possible to his men; he should get personally acquainted with them, not only the office force, but those in the shops and works as well. He should know fully the capabilities of his plant, and be a thorough master of all its details, be courteous and polite, and at all times firm in his capacity as manager. He should hold the scales of justice and respect the rights of employers and employees. He should hold meetings inviting the men of all departments to attend, instruct them in all branches of the business, explain the different appliances with their uses installed by the company; go moving around among the men. There is nothing else which makes a man feel better than to be associating with "the boss." Pat them on the back, for there are lots of men and women who prefer having this kind of encouragement rather than a raise in salary.

A very important matter for a successful manager of a gas company is to keep the service up to the standard at all times. Unless that end of the business is kept in first-class condition, it is a cause of much complaint and worry and reflects on all departments. It is a cause of great expense which could be avoided with a little care.

While on the subject of complaint, I desire to say that every man, woman or child coming into the gas office is there for some purpose, and the same uniform code of courtesy should be accorded to all. The lack of this courtesy is a common fault with most of us. The manager cannot impress too strongly upon all his associates the absolute necessity of treating everyon e in the above manner.

How often one goes into a gas office and directs a remark to some person behind the desk, to have a reply something like this given to him, "I don't know anything about that; it is not in my department." If that clerk would be courteous and endeavor to help the inquiring customer, how much better it would be for the gas company, and incidentally help to make the manager more successful?

There is a general tendency among consumers to feel that they will get no satisfaction by making a complaint to the gas company. This the manager must overcome. He should educate his employees to be polite and courteous to everyone at all times, even if it is a small boy asking for information. A few words in regard to the adjustment of a burner or a gas range, or the placing of a gas mantle, may enlighten a consumer. Naturally he is not as well informed as the employees of the gas company, and this would also save a petty complaint and the expense of a complaint man looking after it; the customer would go out more satisfied and with a better opinion of the company.

The successful manager of any gas company must be able in collecting a force of men around him to so impress them with his personality that they will strive to produce the best results. While always ready to criticise and insist upon work of all kinds being properly done, he should mete out appreciation and extend encouragement for good results; antagonism in the different departments of a gas company should be eliminated. Co-operation should be the word, from the manager down.

There is no question that a manager, in order to be successful in

his business, must use advertising, and I believe he should pay particular attention to this end of the business, especially in the companies which have no advertising manager. Much high-class printed matter is at our disposal, supplied by the different appliance manufacturers, at practically no cost to us, and we should take advantage of it, as it is written by experts to meet our various needs.

A successful manager must necessarily be on good terms with the newspapers of his town and keep in close touch with them, so that instead of "handing him a knock," the manager or reporter would first come to his office, or send for him and talk the matter over and see if something could be done to hold off an intended attack. If the manager is the right sort of man, this can readily be done. You have heard of towns where the manager has taken hold of a plant, and practically every newspaper in the town was "knocking" the company. In a short time the successful manager, owing to his tact and good fellowship, would have every paper on his side.

There is often too much secrecy between the gas company and the consumers. The manager should take the public into his confidence. Impress upon them that the price of every commodity has been advancing during the past several years, and that this advance has not only affected the price of food products, but has affected, very materially, the cost of labor, material and supplies that enter into the manufacture and distribution of gas, but in spite of all this the price of gas has been brought down and the service now tendered them is far better than in the years gone by.

Explain what it costs to run mains, services, and the great investments necessary to make the gas and deliver it at their homes ready for use. Thousands of gas consumers have the impression that gas can be distributed for 15 or 20 cents. Disabuse their minds of this idea. Show them you only want a fair profit for the money invested.

A successful manager would have a first-class commercial or selling department. Many companies make the mistake of employing low-priced salesmen to sell appliances using their product. This is wrong. It is a well-known fact that one good salesman is worth half a dozen poor ones. This type of man, by being in touch with all classes of consumers, can do much to aid the feeling of the public in regard to the company or the manager.

A successful manager would encourage his employees to offer suggestions whereby they think the business could be improved. This places him in closer touch with his men and gives them the impression that they are contributing to the company's success.

Regarding complaints and orders for work to be done. The manager should have this department in such excellent condition that a person, in making a complaint or placing an order, would be able to depend on the completion of the work at precisely the time agreed upon. This is an extremely important matter. Telephone orders should receive as prompt attention as personal calls.

Another matter of importance, and one that would save gas companies much time and expense and be a great relief to the manager, is that of making uniform gas, both as to candle power and B.T.U. There is no excuse for gas to be good one day and poor the next. In large communities, where the local authorities place a fine for gas being below a certain standard, the companies never allow the gas to get below that standard. Therefore, I believe this same thing should apply in all towns.

In the case of the manager of a private firm (he is usually a part of it), he is conscious of the fact that any injustice, indiscretion or lack of judgment will retaliate against his own financial interest as well as the firm's interest. You must liken the position of manager of a gas company unto that of the manager of a private firm. In both cases, in many respects, they are much alike, yet there are many points wherein the positions are different. The manager of a private plant is not apt to be held so strictly accountable for results as in the case of a corporation. With the former it is often the case that the stockholders know nothing of the business and are looking for dividends, but the public service manager has to (first and above all) produce more than simple interest on the investment.

The stockholders will truly say that a plant is not profitable which does not do this. Money invested in government securities will produce simple interest, with no risk. The gas company investor demands that his money not only does this but even more. If a plant cannot show this, it would be useless to seek investors of new capital.

A successful establishment is not satisfied with doing well. Improvement and increase in production, with never lessening dividends, are demanded and must be produced. A manager who cannot show results and do all these things is not successful, and soon finds a dissatisfied board of directors. Thus, he must be able to inspire his principals and patrons with confidence in his ability and fitness for the position and earnest efforts in their behalf. With these qualities he will have ability to do these things and will make a successful manager of a public service corporation.

An Improved Type of Cabinet Gas Range.

An evidence of the demand by gas consumers for a gas range of a better quality and larger capacity than those which have been marketed in most cases in recent years, is the large demand for a compact cabinet range. One of the types which Messrs. Rathbone, Sard & Company have placed on the market to meet this demand is No. 301 "Acorn," which is illustrated herewith. The features which

the manufacturer lay stress upon are, that it has a large oven capacity, it is very compact, it is conveniently arranged, it is very strong and it is highly efficient. A small size is almost a necessity in the average sized kitchen and no doubt the other features have a strong selling value.

The Hygienic Aspects of Gas Lighting and Heating.

The *Medical Magazine*, London, England, gives a report of some experiments recently carried out at the Lewisham Infirmary by the Medical Superintendent, Dr. F. S. Toogood, for the purpose (1) of comparing hygienically the relative values of the open fire and the gas radiator as heating agents; (2) of ascertaining whether and to what extent the atmosphere of a room is affected by incandescent gas burners and lamps; and (3) of ascertaining the hygienic value of the gas fire. Dr. Toogood's general conclusions state that "these experiments may be regarded as having proved conclusively:

(1) That in both large and small apartments, which have normal means of ventilation, gas consumed in modern incandescent burners can be used for lighting without any detriment to health, being found, in fact, to assist ventilation by the increased circulation of the air.

(2) That a gas fire, properly constructed and fixed, not only does not vitiate the air, but is a valuable adjunct to the ventilation of the room.

(3) That in large rooms, adequately ventilated, flueless gas stoves can be used for heating without any hygienic disadvantages, the heated products of combustion (mainly CO_2 and water vapor) ascending quickly above breathing level. This method of heating—by radiation and convection from flueless gas stoves—is economical, but proper ventilation of the buildings in which it is adopted is essential, which, of course, is also the case whatever means of heating be adopted. A ward or other public building, in which gas radiators cannot be used with advantage, is improperly ventilated.

These conclusions, confirming as they do those arrived at by Dr. Rideal and published in the *Journal* of the Royal Sanitary Institute No. 2 (1908), show that gas is not unhygienic when used in a rational and normal manner.

Management & Commercial Methods.

TIPS FROM FITTING TO COMMERCIAL DEPARTMENT.

A GOOD PLAN.—Believing that our fitting department could make itself of considerable value to the commercial department, we offered three prizes, viz.: $5, $3 and $2 to the fitters who turned in during the month of March the greatest number of tips for new business. They had special instruction not to hunt up business, or stop to make sales, etc., but in every case where they heard any comments on an appliance of any description, which showed the least possibility of a prospective buyer or interested customer, the fitter simply jotted down name and address and turned it in with his reports. A record was made of these tips, which were then turned over to the commercial department. In the month in question 81 "tips" were reported, from which, up to April 1st, 36 sales were made as follows: Eight ranges, 16 lamps, 6 fixtures and 6 house piping jobs.—E. G. HOLZER, Easton, Pa.

GAS REPLACES TUNGSTENS AT PITTSBURGH, PA.—The use of artificial gas is being rapidly developed by the Consolidated Gas Company in Pittsburgh, Pa. It is sold at $1 per 1,000 cubic feet, and is replacing

tungstens at 3½ cents per k.w.h. A recent installation shown herewith consists of twelve 5-burner, indoor, and one outdoor Humphrey arcs, which replaced twenty five 100-watt tungsten lamps.—S. B. STEWART, Pittsburgh, Pa.

Meeting Times

OF THE VARIOUS GAS ASSOCIATIONS.

American Gas Institute.—Annual meeting, October 18, 19, 20, 21, 1911. St. Louis, Mo. Officers: President, Donald McDonald, Louisville, Ky. Secretary, A. B. Beadle, 29 West 39th st., N. Y. City.

Canadian Gas Association.—Annual meeting, June, 1911. ———. Officers President, Arthur Hewitt, Toronto, Ont.; Secretary and Treasurer, John Keillor, Hamilton, Ont.

Empire State Gas and Electric Association.—Annual meeting, Nov., 1911. New York City. Officers: President, C. R. Huntley, Buffalo, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street. New York City.

Guild of Gas Managers of New England.—Annual meeting, March. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, Walter G. Africa, Manchester, N. H.; Secretary, H. K. Morrison, Brockton, Mass.

Illinois Gas Association.—Annual meeting, time, March, Chicago, Ills. Officers: President, C. B. Strohn, Elgin, Ills.; Secretary-Treasurer, H. E Newberry, Dixon, Ills.

Illuminating Engineering Society.—Annual meeting, Oct. Chicago, Ill., 1911. Meetings of Sections, monthly. Pres't, A. E. Kennelly, Boston, Mass.; Secretary, Preston S. Millar, 29 W. 39th street, N. Y. City. Sections: New York: Secretary, Albert J. Marshall, 36 West 39th street. New England, Secretary, W. S. Farrow, 1210 Massachusetts avenue, Cambridge, Mass. Philadelphia, Secretary, G. B. Muth, 1000 Chestnut street Chicago, Secretary, F. H. Bernhard, Marquette Building.

Indiana Gas Association.—Annual meeting, Jan. 17 and 18, 1912, Indianapolis. Officers: President, S. E. Mulholland, Fort Wayne; Vice-President, Howard L. Olds, Indianapolis; Secretary-Treasurer, Philmer Eves, Indianapolis.

Iowa District Gas Association.—Annual meeting, time, June, 1911, ———. Officers: President, Austin Burt, Waterloo, Ia.; Secretary and Treasurer, G. I Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, time, ——— ——— Wichita, Kas. Officers: President, W. A. Scothorn, Hutchinson, Kas.; Secretary and Treasurer, J. D. Nicholson, Newton, Kas.

Michigan Gas Association.—Annual meeting, time, Sept. 20, 21, 22, 1911; Detroit, Mich. Officers: President, A. P. Ewing, Detroit, Mich.; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April, 1912; St. Louis, Mo. Officers: President, F. E. Murray, Louisiana Mo.; Secretary and Treasurer, N. J. Cunningham, Springfield, Mo.

National Commercial Gas Association.—Annual meeting, October 23-28, 1911. Denver, Officers: President, C. N. Stannard, Denver; Secretary, Louis Stotz, 29 West 39th street, New York City.

Natural Gas Association.—Annual meeting, May 16, 17 and 18, 1911; Pittsburgh, Pa. Officers: President, John M. Garard, Columbus, O. Secretary, T. C. Jones, Delaware, O. Editor Wrinkle Department, F. W. Stone, Ashtabula, O.

New England Gas Association.—Annual meeting, third Wednesday in February, 1911; Boston. Officers: President, W. H. Snow, Holyoke, Mass.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

Ohio Gas Association —President, John M. Garard, Columbus, O.; Secretary-Treasurer, T. C. Jones, Delaware, O.

Oklahoma Public Utilities Association.—Annual meeting, May 9, 10 and 11, 1911. Officers: President, E. C. Reynolds; Secretary, Galen Crow, Guthrie, Okla.

Pacific Coast Gas Association.—Annual meeting, Sept. 20, 21 and 22, 1911, Oakland Cal. Officers: President, F. A. Leach, Jr., Oakland, Cal.; Vice President, W. Baurhyte, Los Angeles, Cal.; Secretary-Treasurer, John A. Britton, 445 Sutter street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, April, 1912, Williamsport, Pa. Officers: President, C. W. Butterworth, Millon, Pa; Secretary-Treasurer, William H. Merritt, Lebanon, Pa.

Society of Gas Lighting.—Annual meeting, December, 1911; monthly meeting, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 254 West 81th street, New York city.

Southern Gas Association.—Annual meeting, April, 1912, Jacksonville, Fla. Officers: President, H. B. Hoyt, Jacksonville, Fla.; Secretary-Treasurer, E D. Brewer, Atlanta, Ga.

Southwestern Electrical and Gas Association.—Annual meeting, April 27, 28, 29, 1911; Houston, Tex. Officers: President, W. B. Tuttle, San Antonio, Tex.; Secretary, D G. Fisher, Dallas, Tex.

Wisconsin Gas Association.—Annual meeting, May 17 and 18,, 1911, Milwaukee, Wis. Officers: President, W. H. Winslow, Superior, Wis.; Secretary-Treasurer, Henry Harmon, Milwaukee, Wis.

PUBLIC LIGHTING TABLE FOR MAY, 1911.

[COMMUNICATED BY THE AMERICAN METER COMPANY.]

Day of Week.	MOONLIGHT SCHEDULE.		
	Date.	Light.	Extinguish.
Monday	1	7.20 P.M.	4.00 A.M.
Tuesday	2	7.20	4.00
Wednesday	3	11.50	4.00
Thursday	4	12.30 A.M.	4.00
Friday	5	1.00 F.Q.	4.00
Saturday	6	1.30	4.00
Sunday	7	2.00	3.50
Monday	8	2.20	3.50
Tuesday	9	2.40	3.50
Wednesday	10	3.00	3.50
Thursday	11	No L.	No L.
Friday	12	No L. F.M.	No L.
Saturday	13	No L.	No L.
Sunday	14	7.40 P.M.	9.50 P.M.
Monday	15	7.40	10.50
Tuesday	16	7.40	11.40
Wednesday	17	7.40	12.30 A.M.
Thursday	18	7.40	1.10
Friday	19	7.40	1.40
Saturday	20	7.40 L.Q.	2.10
Sunday	21	7.40	2.40
Monday	22	7.40	3.00
Tuesday	23	7.40	3.30
Wednesday	24	7.40	3.40
Thursday	25	7.40	3.40
Friday	26	7.40	3.40
Saturday	27	7.40 N.M.	3.40
Sunday	28	7.50	3.40
Monday	29	7.50	3.40
Tuesday	30	7.50	3.40
Wednesday	31	7.50	3.40

AT the annual meeting of the Lambertville (N. J.) Gas Company, the Directors elected were: A. D. Anderson, Wm. Lilly, Torbert Coryell, Geo. L. Romine, F. W. Van Hart, John Lily and Geo. W. Massey.

Ornamental Gas Street Lighting.

The American Gas Light Company, of Kalamazoo, Mich., has had great success with its new 3-light ornamental lamp post equipped with single burner arcs.

Both gas and electric companies are striving for this business and both are looking for new designs in posts and lamps that will enable them to successfully compete.

The post which is shown herewith is made in 3 sections, base, shaft and top, the height being 15 feet.

Drip tubes ample to care for all condensation are provided in the post.

The Junior lamp which is used, is made of heavy sheet steel, porcelain enameled throughout; it is wind, rain and bug proof, and gives a high candle power. A 9-inch globe, either clear, opalescent or acid-roughed, is used with the lamp and the combination gives all the effect of electric lamps, only more light and at less cost.

One particularly good feature of the lamp is the slidable chimney which comes down over the mantle when the globe is removed, protecting this fragile part from the wind.

Thoroughly tested, both lamp and post are ready to help you secure street lighting business.

These units have been installed in competition with the newer types of electric standards, and cover a field which has not been developed to a large extent by gas companies.

Recent Patent Issues.

Prepared for the AMERICAN GAS LIGHT JOURNAL by ROYAL E. BURNHAM, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 10 cents.

989,654. Automatic Gas Lighter and Extinguisher. F. W. Sherman, Everett, Mass., assignor to Independent Street Lighting Company, Boston, Mass.

989,661. Gas Producer. K. J. Sundstrom, Detroit, Mich.

989,766. Lamp. W. C. Coleman, Wichita, Kas.

989,767. Bracket Lamp. W. C. Coleman, Wichita, Kas.

989,842. Oven for Gas Stoves. F. L. Goodrich, Belvidere, Ills.

989,967. Obtaining Naphtha from Natural Gas. G. M. Saybolt, Jersey City, N. J., assignor to Standard Oil Company, Bayonne, N. J.

990,125. Bill Delivery Mechanism for Meters. R. W. Gallagher, San Francisco, Cal., assignor to Automatic Billing Company, Los Angeles, Cal.

990,212. Apparatus for the Manufacture of Power Gas. E. Fleischer, Dresden-Strehlen, Germany.

PUBLICATIONS.

Industrial Burners.—The Lloyd Construction Co., Detroit, Mich., has issued a pamphlet describing its proportioning mixer.

Thermometers.—The Industrial Instrument Co., Foxboro, Mass., has issued a descriptive bulletin, No. 41, describing both indicating and recording thermometers.

Trenching Machines.—The F. C. Austin Drainage Excavator Co., Chicago, Ills. Descriptive pamphlet covering trenching machines, suitable for main work.

Ranges.—The Michigan Stove Co., Detroit, Mich. Catalogue *de luxe* of Garland ranges, heaters and appliances.

Items of Interest
FROM VARIOUS LOCALITIES.

MR. NORMAN MACBETH, Manager of the Illuminating Engineering Laboratories of the Welsbach Company, from February 1, 1909, to April 29, 1911, has accepted the position of Illuminating Engineer for the Westinghouse Electric Manufacturing Company and the Westinghouse Lamp Company, of Pittsburgh, Pa., and Bloomfield, N. J. With much regret we announce this, for Mr. Macbeth's work, in extending the use of gas for illuminating purposes, for long time past has been of incalculable value to the industry. However, as the change no doubt is based on material reasons alone, we are, nevertheless, constrained to say that, wherever he goes or whatever he does may the best of good luck attend him.

"B. M. B.," writing from Wilmington, Del., under date of April 21st, says: "I inclose you the following account of that which happened at the regular meeting of 'Gas Study Club,' which was held last Tuesday evening. The main feature of the affair was a most interestingly instructive lecture on foreign travel, by the Rev. Alfred E. Gray, Spiritual Director, Grace M. E. Church, Wilmington. The lecturer (his story was punctuated by many well shown slides) carried his audience over many thousands of miles, and all were sorry that their journey's end was reached too soon. However, the Club evidenced its appreciation of the Doctor's work by awarding him a rising vote of thanks. Mrs. Herman, the clever demonstratress in charge of the domestic science division of the Company, spoke most entertainingly on the nature of the work done by her craft, the best effects of which she thought were brought out through the practice of the Wilmington Company in this regard. The election for the Club's officials does not occur until the first meeting night in May, but as the following names for office bearers were posted on the bulletin the night of the 18th, it may be taken that the contest will be a lively one. The respective nominees are: For President, Messrs, France, Fedigan, Morris, Lawlor, Plank, Strokel and Wilgus; for Vice-President, Messrs. Wilcox and Lankford; for Secretary, Mr. Vernon—of a certainty; for Treasurer, Messrs. Van Sant, Bothum and Gray; for Council of Four, Messrs. Berg, Thomson, Wilcox, Schuber, Heckert and Curley. The Club's affairs are in the best possible condition."

GENERAL MANAGER NEUBERT, of the San Mateo (Cal.) Gas and Electric Company, announces that hereafter the selling rate for gas shall be $1.25 instead of $1.50 per 1,000, and that the rate for electric current will be 8 cents per watt-hour instead of 10 cents.

MR. WILLIAM MCKENZIE, President of the Northern Canadian Railroad, and his associates, have positively decided upon the construction of a gas plant in Monterey, Mexico.

MR. R. F. SPEAR (familiarly known as "Rod." to his intimates, who are many) has severed his relations with the Western Gas Construction Company, of Fort Wayne, Ind., to assume the management of the Geyser Oil Tank Company, also of Fort Wayne. Sorry are we that he has cut loose from the active ranks of the fraternity; but, come to think of it, there's no good reason why the Geyser Oil Tank folks shouldn't become acquainted with the gas men, and 'Rod." is the one to develop such acquaintanceship.

THE officers of the Guild of Gas Managers (New England) for the year are: President, Walter G. Africa; Vice-President, Benj. J. Allen; Secretary, H. K. Morrison.

THE gross earnings of the Houston (Tex.) Gas Company for the year were $296,175.54, of which $1,365.09 was for tar and cinders.

THE commodious store, corner of Broad and John streets, Bridgeport, Conn., heretofore occupied by Wooster & Atkinson, has been leased by the Gas Appliance Company, and it will be so equipped that it will carry a complete line of appliances of all sorts that are of interest to gas maker and gas consumer. The chief parties in interest in this enterprise are Mr. R. E. Sprot, formerly in the new business department of the Bridgeport Gas Company, and Mr. St. L. Sterrett, of the Susquehanna Railway, Light and Power Company—that is these gentlemen will have charge of the sales' end of the business.

THE Everett (Wash.) Gas Company is proposing to extend its main system to and through the outlying settlement of Monroe. The Company is also constructing a 2-story cement and brick structure, to serve for appropriate office use and as a transformer station.

"B. M. B.," is informed that the annual meeting of the Roanoke (Va.) Gas and Water Company will be held in its Roanoke offices (No. 301 Henry street) at noon of Tuesday next. The Company's clever Secretary (Mr. E. R. Agner) will have the satisfaction of presenting a set of figures showing that the Company's year was a prosperous one.

MR. T. B. LEWIS, writing under date of the 21st inst., incloses the following "Failing to notice anything in 'Old Reliable' respecting the opening of the Laclede Company's spick-and-span branch office at California and Gravois avenues, earlier this week, I send this account thereof: A reception was tendered the people of the neighborhood in which the new office is located, and speeches were made by several well-known St. Louisans. The new building will be managed as an establishment aside from the central offices, and all work in connection with the placing of meters, issuing bills, will be done therefrom. Of course, the central office at Seventh and Locust streets will be the main thing as heretofore. An orchestra played sweet tunes and a goodly number of 'sweet young things' distributed carnations, the vivid colorings of which were no more attractive than the fair misses who offered them. Four speakers dilated upon the greatness of gas as an aid to the development of true comfort in the house, and the goodness of the Company in its dealings with the public. The chief speaker was Dr. Otto F. Karbe, President of the Southwestern Mercantile Association; the others were Messrs. C. W. Haynor, O. F. Fischer and A. F. Ittner. The branch will serve as headquarters for 75 persons, 35 of whom will be in the meter and fittings appliance division. The building is lighted perfectly (both as to interior and exterior) by means of mantle lamps. The exterior provision is for 22 arcs of 1,000-candle power each, and the effect is particularly pleasing. The speechmaking was followed by an excellent light refreshment, the manipulators of which were the Mistresses Elizabeth Munich and Elizabeth Noland, and the Misses Mortimer and Mullen."

A REFERENCE to our advertising columns will show that Mayor Callison and Town Clerk George Marston are asking for bids for a gas plant for Dexter, Ia. The authorities are undecided as to whether a water gas plant or an acetylene apparatus shall be installed; but that high pressure is to be a go would look from the "diameters" of the mains (?) specified. Under ordinary conditions the specified ones could be made to act as service pipes. The Mayor and the Town Clerk might be nearer the mark did they expend $500 or so in connection with engaging an engineer to tell them what the wise thing was to do.

SECRETARY STEINWEDELL informs us that his Company has been awarded a contract by the proprietors of the New Orleans (La.) Railway and Light Company for the construction of a new 11-foot water gas apparatus and the reconstruction of 2 old 11-foot and a second 2 old 8-foot 6-inch water gas sets. The Gas Machinery folks, too, in addition to the above, are under contract to place in the New Orleans plant 3 outdoor steel purifiers boxes, on beams and columns, complete, with the necessary oxide-elevators, connections, etc. This work practically completes the reconstruction of the New Orleans Company's plant, thus putting its proprietors in good position to give to their consumers the very best service possible.

THE Central New York Gas and Electric Company has announced that, commencing June 1st, the gross gas rate in Palmyra, N.Y., will be cut to $1.60 per 1,000, with the following discounts on quantities account—the stipulation is payment within 15 days: First 2,000 cubic feet, $1.45, net; second 3,000, $1.35; next 10,000, $1.25; above 15,000 feet, $1.20. It is also arranged that considerable main laying shall be done, notable being a good line right through Cuyler street, which will greatly ameliorate pressure conditions.

CERTAIN Minneapolis (Minn.) capitalists, headed by that clever gentleman, Mr. W. H. Ryder, of that city, have determined upon constructing a lignite briquetting plant, up to an output of 300 tons, and an output of gas equalling 1,500,000 cubic feet daily, in Minot, N. D. The people behind the enterprise are the Washburn interests of Minneapolis, and it corporate title is the Missouri Valley High Carbon Fuel Company. The initial unit of the plant will be gone on with at once, at an estimated cost of $150,000.

MR. CHESTER W. MACOMBER, since 1890 a valued employee of the Taunton (Mass.) Gas Company, has resigned from its service to enter into business on personal account in the gas, water and steam fitting line. His headquarters are in 77 County street, Taunton.

MR. W. T. SHARP, formerly connected with the lighting interests of Newport News, Va., has been appointed Superintendent of the Emporia (Va.) Hydro-Electric Power Company. Mr. Collis continues as Manager of the concern.

THE proprietors of the Oakland (Cal.) Gas Company, which plant supplies gas to the Richmond district, have announced that, beginning June 1st, the rate in Richmond shall be $1.25 instead of $1.50 per 1,000. An extension of the main system has been bargained for. A still further sensible step was taken when Mr. E. J. Colbert was appointed Local Agent.

CARLISLE (Pa.) wants a sewerage system, the estimated cost whereof will be $99,000, and that sum was voted affirmatively at a recent election, held to determine whether or not. The city meanwhile is the owner of a considerable shareholding in the Carlisle Gas and Water Company, which represents quite a money value. Since the election, several malcontents have instituted proceedings to prove the invalidity of the voting bee, wherefore the Council or Borough representatives are between the Arch Conspirator and the deep sea. But, as in all events that transpire humanly, Daniel is sure to crop out, and the Carlisle instance offers renewed proof of this. The "Daniel" is none other than Mr. Jas. W. Eckels, Chairman of the Sewerage Committee, who has suggested to his colleague, "Sell the gas and water stock; build the sewerage system out of the proceeds." Sure thing, Mr. Eckels; let that gas stock go into the strong boxes of intelligent owners.

THE New England Coal and Coke Company has purchased a 60 per cent. ownership in the "J. B. B." Coal Company, of West Virginia, the possessor of something like 3,500 acres of very valuable coal lands in the State named. The Coal and Coke Company is dominated by the Massachusetts Gas Companies.

MR. W. A. BAEHR has been retained by the authorities of Wheeling, W. Va., to direct the work of properly refitting the municipal gas plant there. It is likely that hereafter the works will contain a good example of modern water gas apparatus.

WE understand that Governor Johnson has signed the bill which recently received the sanction of the California Legislature, directing that gas and electric companies, and other corporations engaged in the business of "furnishing light, power, water or gas" shall sell such commodities to all persons desiring such supply when proper application is made therefor. In case of refusal on the part of Company, the applicant, 10 days after the application was made, shall be entitled "to collect" $50 from the Company or person, and after that "collection" shall be entitled to "collect" the further sum of $5 per day for each day the service is refused.

THE Boston Elevated Railway Company has purchased from the Boston Consolidated Gas Company the premises heretofore owned by the latter, on Camden street, between Columbus avenue and Tremont street. There is an old holder on the site.

THE Atlas Paint Company, of Nashville, Tenn., "To take care of the increasing business, due undoubtedly to our advertising in the AMERICAN GAS LIGHT JOURNAL, backed up by the quality of the goods subsequently delivered, have been removed to suites 1125-1127 Stahlman Building. It will be interesting to note that our paint is following the Sun. We started in Florida last February, and have now reached Tennessee. Meanwhile, paint is being distributed in the more Northern States, including Pennsylvania, New Jersey, New York, Michigan, Wisconsin and Iowa." So writes the General Manager of the concern, Mr. A. S. B. Little.

THE Peterboro (Canada) works were scorched by flames the night of the 17th ult. To judge by the Press dispatches the plant was all but demolished. We are glad to say, however, that $600 will restore the place completely.

The Market for Gas Securities.

The quotation for Consolidated this morning (Friday) is 143-143½, which increase over last week is less by one quarter point, notwithstanding that the shares are now carrying the regular quarterly dividend of 1½ per cent. This is payable June 15th to shareholders of record up to the 17th inst. The Company's business shows a remarkable increase.

Brooklyn Union advanced rather sharply last week, and those who should know what they are talking about in respect of these shares, are suggesting that an event is likely to come off soon that will give it possession of a Company already and well in the Brooklyn lighting field. It is 141-42. Both Peoples, of Chicago, and Laclede, of St. Louis, are in better demand, at higher figures. Respecting the former it is safe to say that the gas rate in that city will not go below 75 cents, with an even chance for an 80-cent figure! The outlook continues to favor the investor.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

MAY 1.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$78,177,000	100	143	143½
Central Union Gas Co.— 1st 5's, due 1972, J. & J.	3,000,000	1,000	103	105
Equitable Gas Light Co.— Con. 5's, due 1932, M. & S.	1,000,000	1,000	115	118
Mutual Gas Co.	3,500,000	100	155	165
New Amsterdam Gas Co.— 1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	101½
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	35	50
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98½	100½
New York and East River— 1st 5's, due 1944, J. & J.	3,500,000	1,000	103	105
Con. 5's, due 1945, J. & J.	1,500,000	—	95	100
Northern Union— 1st 5's, due 1927, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	53	70
Preferred	5,000,000	100	70	100
1st Mtg. 5's, due 1960, M. & N.	1,500,000	1,000	103	105
The Brooklyn Union	15,000,000	1,000	141	142
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¾	107
Yonkers	299,650	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	¾	5-16
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	—
" 1st Mtg. 5's	500,000	1,000	95	100
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	50	60
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,660,000	1,000	104	104½
Cincinnati Gas and Electric Co.	29,500,000	100	92	95
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90½	91
Preferred	3,026,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	106½	—
Mortgages, 6's	3,600,000	-	89	100
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	—
Con. Mtg. 5's	976,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	3,500,000	—	102	105
Detroit City Gas Co.	6,580,000	—	—	50
" Prior Lien 5's	5,619,000	1,000	97	100½
Detroit Gas Co., 5's	381,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,350,000	1,000	100	101
Hartford	750,000	25	190	200
Indianapolis	2,000,000	—	78	83
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis.	10,000,000	100	102¼	103
Preferred	2,500,006	100	91¾	102
Bonds	10,000,000	1,000	102½	103
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,370,000	50	143	145
Madison Gas and Electric Co. " 1st Mtg. 6's	400,000	1,000	106	108¾
Massachusetts Gas Companies, of Boston	25,000,000	100	91	91½
Preferred	25,000,000	100	95	95½
Montreal Gas Co., Canada	2,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	137	138
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	105¼	105¾
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104¾	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.— 1st Mtg. 5's	1,000,000	1,000	100	102
St. Paul Gas Light Co.	2,500,000	100	—	—
1st Mortgages, 6's	850,000	1,000	104	108
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	3,447,000	1,000	97	98
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	101	103
Washington (D. C.) Gas Co.	1,800,000	200	410	412½
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	361	—

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New advertising, or changes in standing ads., to assure attention the issue following their reception, must be in hand on Wednesday.

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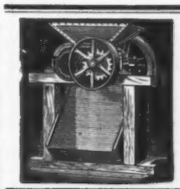

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Columbus, Ind.

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A gas and electric engineer desires a position as engineer or manager. Good record and references.

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Position as manager or superintendent of gas or electric company, by young man with practical experience in the manufacture and distribution of coal and water gas. Is familiar with electric generation and distribution. Can furnish any required references.

Address, "W. H.,"
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Address, "THOROUGH,"
1873-1 Care this Journal.

POSITIONS OPEN.

Wanted, GENERAL FOREMAN for a combined coal and water gas plant, having an output of 6,000,000 cubic feet of gas per day. Applicants must have knowledge of both coal and water gas manufacture, and be able to handle men. Address, stating age and experience,

"EXHAUSTER,"
1873-2 Care this Journal.

MISCELLANEOUS.

NOTICE TO CONTRACTORS.

Notice is hereby given that sealed proposals or bids will be received by the town of Dexter, Dallas County, Ia., an incorporated town of 800 people, up to and until 4 P.M. of the 15th day of May, 1911, for the making and construction of a complete high pressure water gas works, or an acetylene system, with all necessary connections and appliances to connect with street mains, 40 street lamps and posts, properly installed and connected with mains.

Said bids or proposals shall also include the erection of a brick or cement block building or buildings, suitable to properly house such plant as the bidder may propose to erect.

Bids will also be received at same date and place for the installation of the following: 2,032 feet of 2-inch, 2,017 feet of 1¼ inch, 5,147 feet of 1¼-inch, 11,585 feet of 1-inch wrought iron mains; also, 25 2-inch by ¾-inch saddles; 25 1¼-inch by ¾-inch saddles, and 100 tees for the smaller sized mains.

Bids shall be accompanied with complete plans and specifications of the building, machinery, mains, lamp posts and lamps which the bidder proposes to furnish and install, stating the date at which same shall be completed. Each bid shall be accompanied with a certified check to the amount of 20 per cent. of the price named by the bidder, said check payable to Mr. George Marston, Town Clerk, without conditions, as a guarantee that the bidder will enter into contract and give bonds satisfactory to the town of Dexter, to complete the work at the price and in accordance with plans and specifications furnished by him.

Each bid must be signed by the bidder and his address given. Certified checks will be returned to all unsuccessful bidders, and to the successful bidder when contract is made and approved. All bids will be opened at 8 P.M. of date above named. The town reserves the right to reject any and all bids. Plats of town will be supplied all persons wishing to bid.

S. CALLISON, Mayor.
1873-2 GEORGE MARSTON, Town Clerk.

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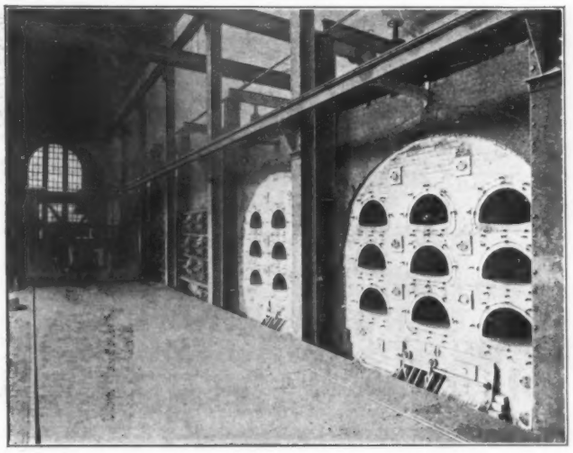

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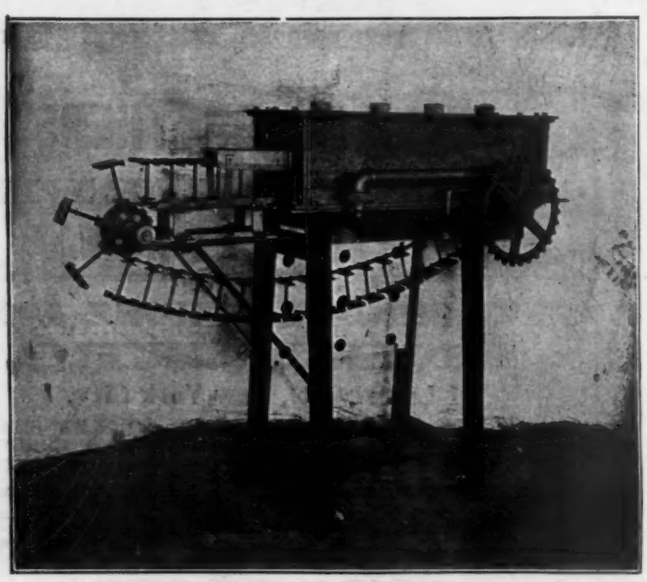

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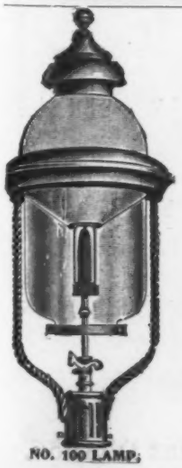

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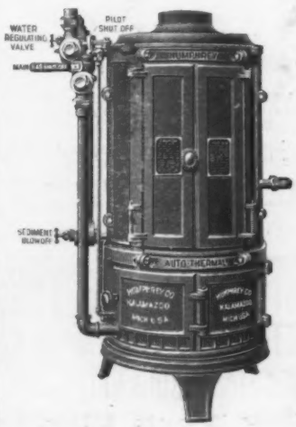

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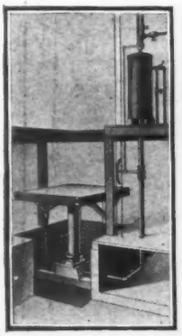

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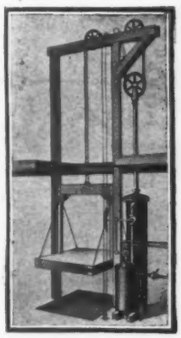

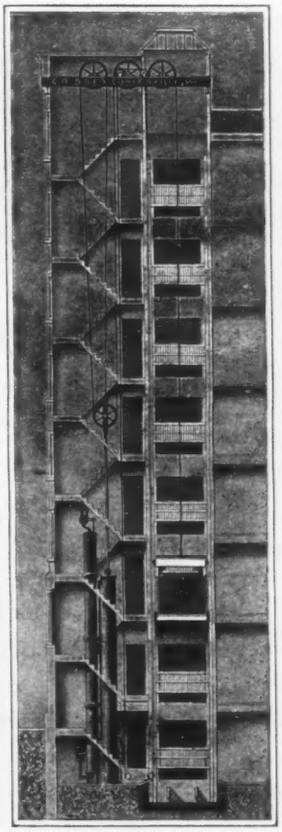

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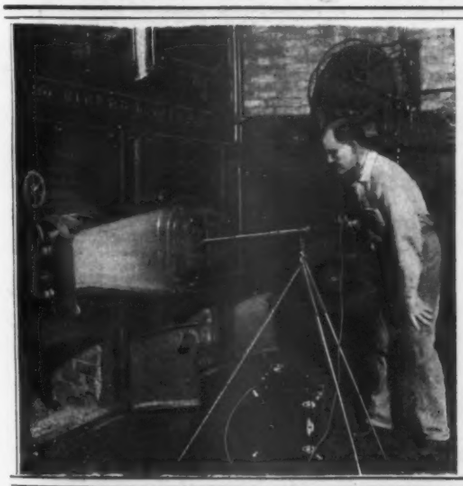

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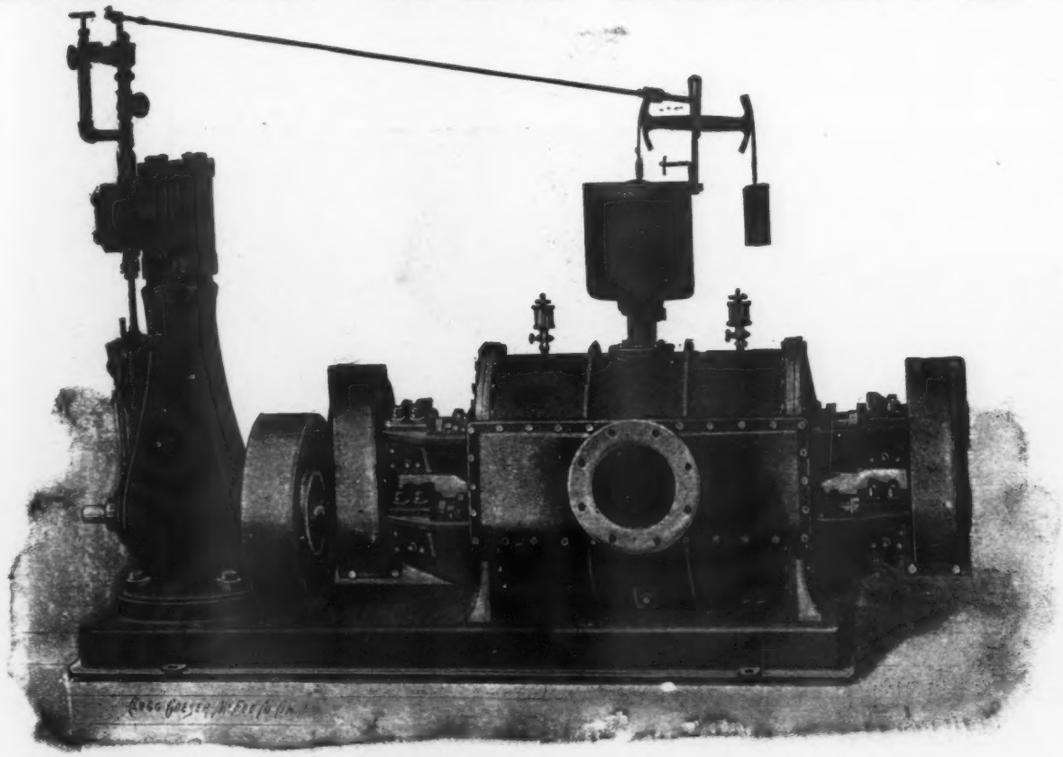

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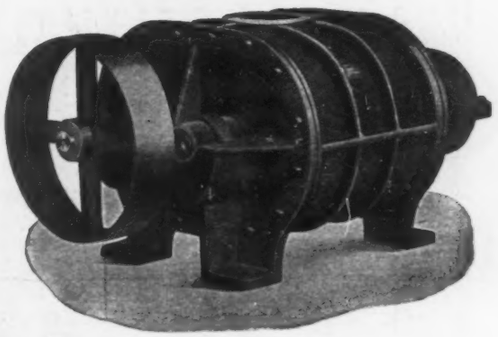

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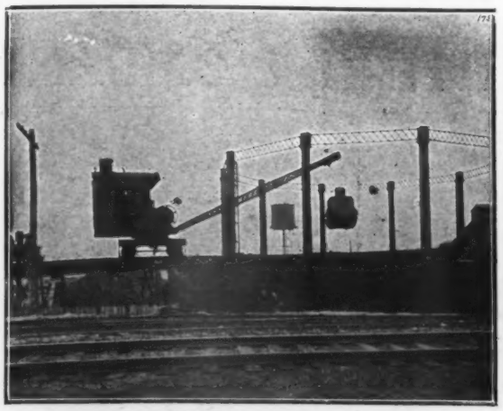

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The illustration shows equipment in use at Malden and Melrose Gas Light Company.

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It cuts down the time, the labor and the expense, besides greatly simplifying the task.

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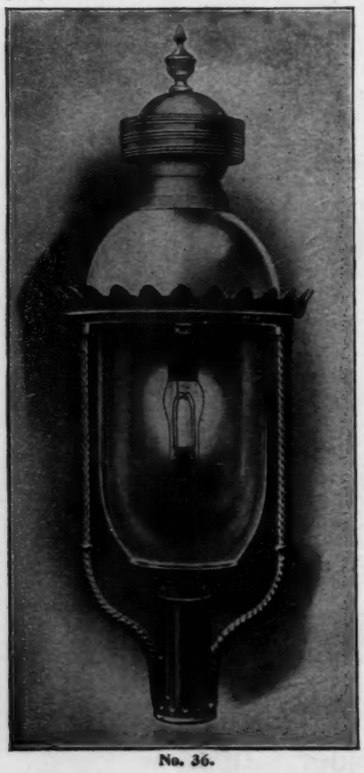

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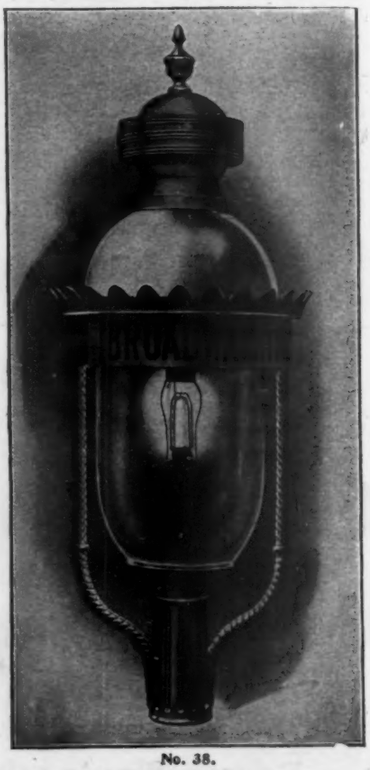

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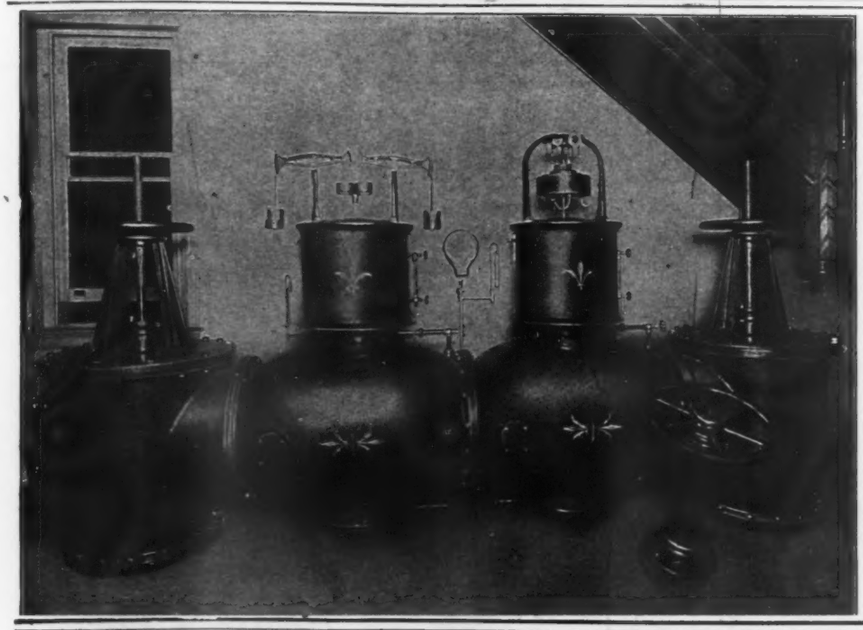

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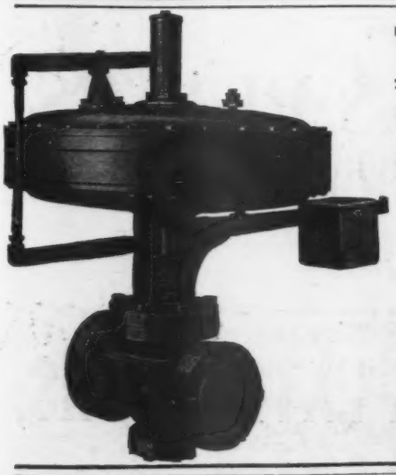

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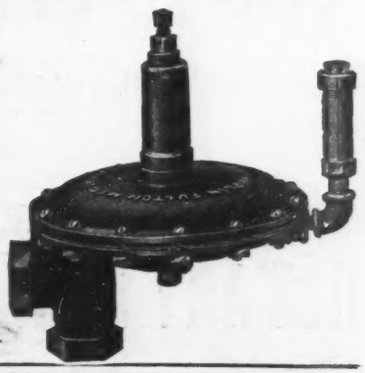

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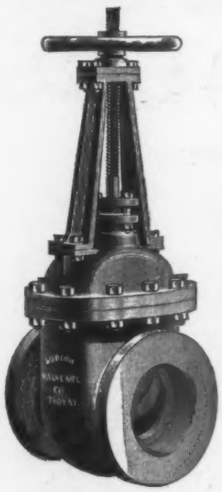

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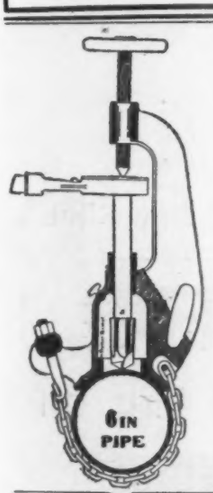

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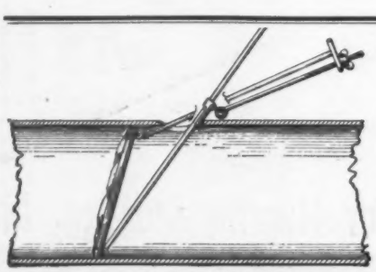

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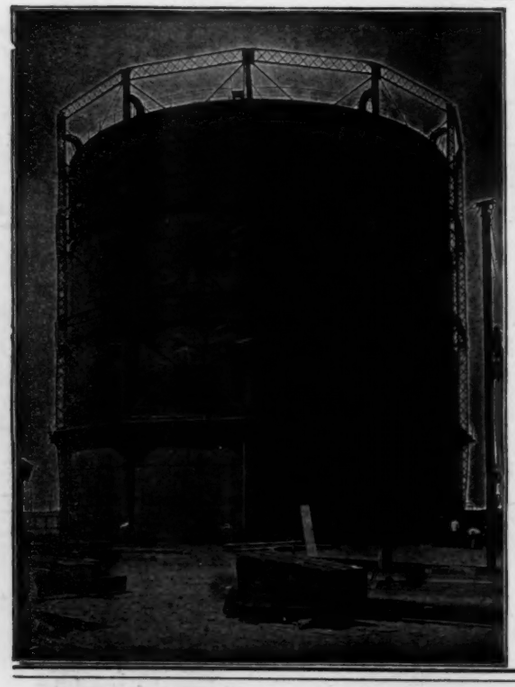

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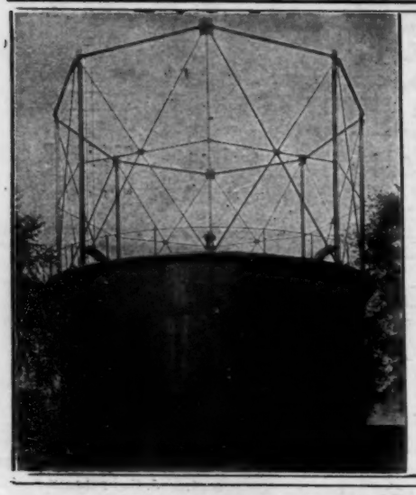

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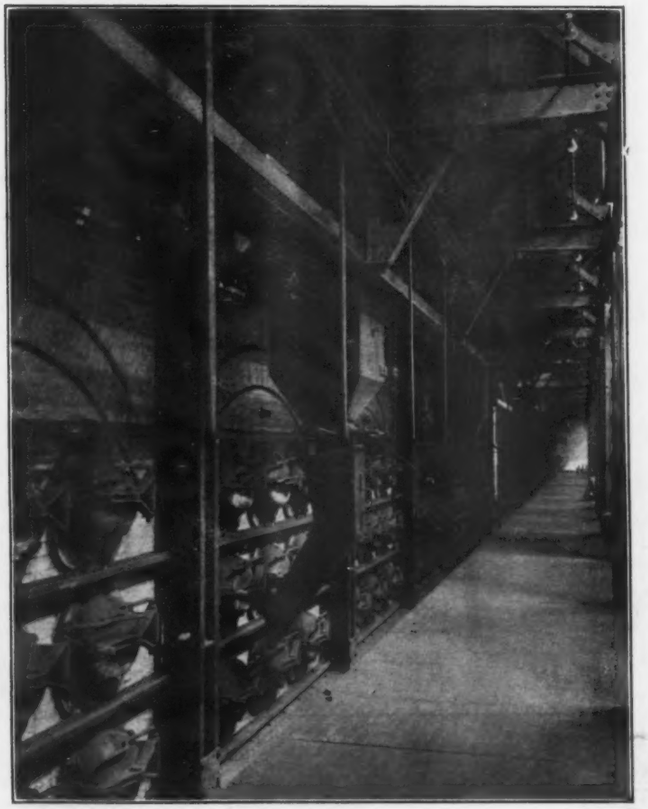

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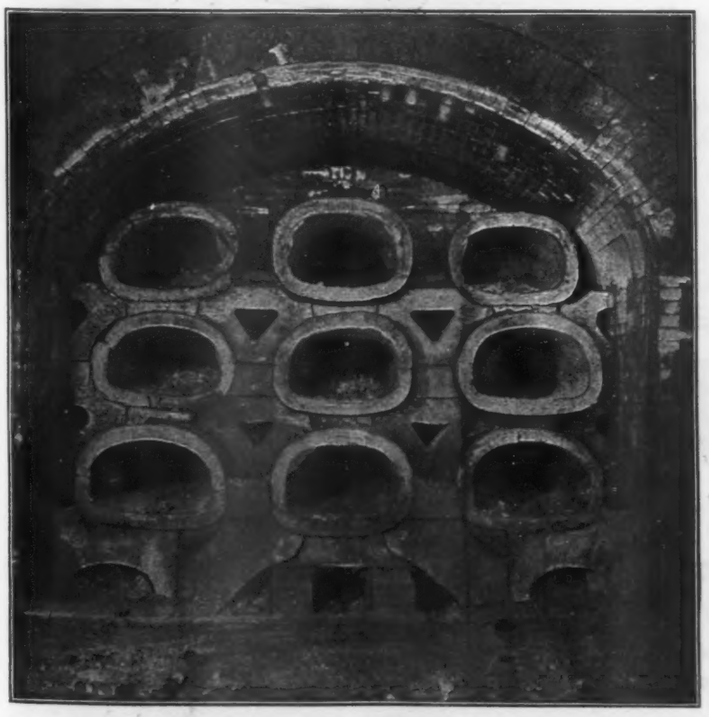

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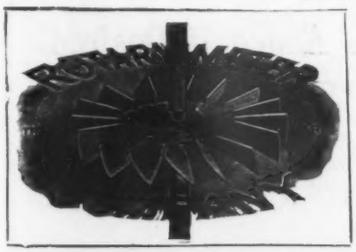

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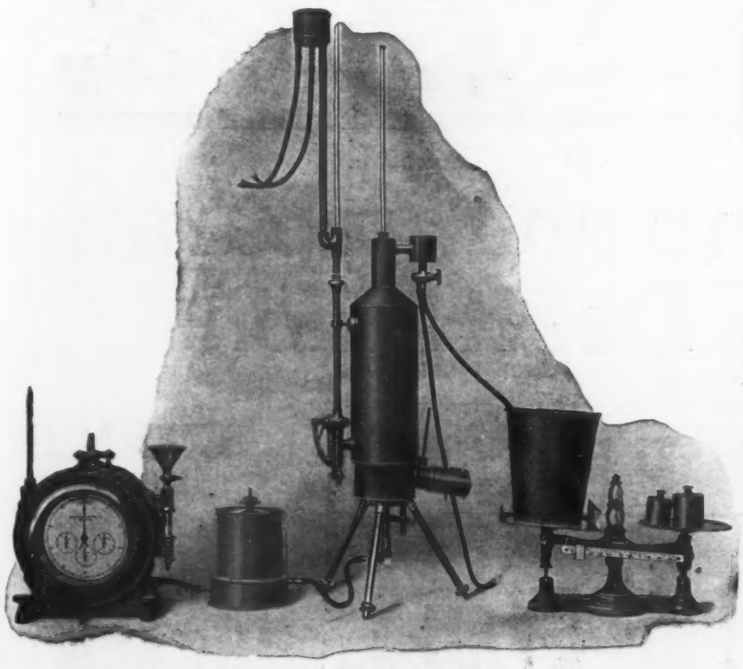

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